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USER PRODUCTIVITY GROUP FINAL REPORT AND RECOMMENDATIONS

This 13 page report synthesizes the comments made by a representative sample of ARC staff interviewed during a 2 month period (March - April, 1975) as part of the activities of the UPG group requested by DCE.

USER PRODUCTIVITY GROUP FINAL REPORT AND RECOMMENDATIONS
Performance and Productivity in the ARC NLS Environment

1

INTRODUCTION

2

During the last week in March, 1975, DCE established a special group to investigate an increasingly serious problem: ARC productivity subsequent to the loss of our PDP-10. JHB was appointed to coordinate the group (CHI was appointed to a similar role for the service performance group). The following goals were outlined by Doug during an all-ARC meeting where resource problems were discussed; the group's efforts toward these goals are reported in the remainder of the report. 2a

UPG Goals (DCE): 2b

To integrate information on which working methods, techniques and strategies will optimize the utilization of all the tools available in the ARC user's NLS environment. 2b1

Secondary goals: 2b2

To integrate information on the following: 2b2a

What affects productivity and can be improved; 2b2a1

Describe the present working methods, etc., in terms of productivity and computer resources as well as individual satisfaction. 2b2a1a

What techniques increase productivity; 2b2a2

What plans and expectations for changes affect productivity; 2b2a3

To support those who are responsible to get particular work done, with recommendations, information, training, etc. for improving productivity. 2b2b

Examine alternatives to present working methods, etc., and prepare scenerios and provide resources for their use, e.g., DEX. 2b2b1

Determine which working methods, either online, offline, or a mix are most productive and efficient. 2b2b2

To coordinate the setting up and operation of special

schedules, special support services, etc., to facilitate increased productivity. 2b2c

To support the service performance group with user-problem information relevant to diagnosis, and with information and recommendations relative to priorities as related to productivity. 2b2d

Method: 2c

An open ended, semi-structured, interviewer active survey of the ARC staff was the primary method, particularly to ascertain performance technique. 2c1

Interviewees were presented with a page of general areas that their comments might be relevant to. This facilitated the response and subsequent structuring of the data. 2c1a

Case study type observations supplemented by time and motion studies were also considered. 2c2

Stopwatch timing of typical job function processes indicated that the method is better used in experimentally controlled studies. 2c2a

OVERALL PRODUCTIVITY 3

Productivity was reported to be considerably lower than prior to the loss of the SRI-ARC computer, as was expected. The primary bottlenecks cited were (in order of importance): 3a

1) DNLS response
2) hardware and software reliability
3) resource availability and quality. 3a1

Estimates of the current percentage of usual productivity were: 3b

1% -- 1 person
25% - 33% -- 8 persons
50% -- 2 persons
60% -- 2 persons
75% - 80% -- 1 person. 3b1

Note that not all ARC was interviewed, however, the sample was judged representative when responses became restatements of comments voiced during preceding interviews. 3c

A secondary cause of low productivity was cited: upset and frustration due to the difficulty of making a contribution or

complete meaningful work, and the continual confrontation with the bottlenecks. This problem continues (as of June, '75) to manifest itself in the form of an overall, low moral. 3d

As indicated in the goals of UPG the purpose of this report is to recommend ways in which the current productivity bottlenecks can be circumvented, rather than recommend major system changes or identify major system problems. 3e

RECOMMENDATIONS TO INCREASE CURRENT PRODUCTIVITY 4

1. Increase Use of TNLS 4a

TNLS was reported by a majority of respondents to be more effective for most NLS functions. In cases where there was disagreement, TNLS was disfavored primarily due to ingrained working methods and special requirements. Specific functions cited for TNLS: 4a1

-- Online composition, text and data entry (5 persons) 4a1a

-- Batch type jobs: running process commands and programs, running printouts, monitoring processes, etc. 4a1b

-- TTY oriented tasks: directory cleanup, setting Useroptions, checking status composition, text and data entry (5 persons) 4a1c

-- Using DDT (highly recommended by 2 persons) 4a1d

-- Reading, sorting, and sending mail-- both Sendmail and SNDMSG (SNDMSG is obviously TTY oriented, but Sendmail with its TTY status listing, and sequential command format, was also found to be appropriate to a TTY) 4a1e

-- Tasks where a transcript of the session would be useful, e.g., to refer back to previous activity 4a1f

-- Structure editing was cited as faster and more reliable for restructuring that can be noted on printouts beforehand. 4a1g

-- Recommended procedure for TNLS structure editing: 4a1g1

(1) Printout document/code with SID's 4a1g1a

(2) Have printout of sources other than working document with SID's 4a1g1b

(3) Mark printout with changes using SID's, e.g., Move Statement 017 to 122 down 4a1q1c

(4) Repeat with new printout if restructuring too complex for one pass 4a1q1d

2. Reserve DNLS for Certain Tasks 4b

Approximately 90% of our staff interviewed stated that TNLS was as good as or better than DNLS for many tasks, at least under present conditions. The general concensus was that DNLS is more effective for 3 kinds of tasks: 4b1

1) Within statement editing, moreso if there are a large number of edits within each statement; 4b1a

2) Structure viewing - where several successive clipped views are used to see structural relationships in larger files 4b1b

3) Certain programming applications, such as debugging DNLS. 4b1c

DNLS is generally more attractive, on a philosophical level, because it represents the kind of technology we are developing and transferring. On a specific level, it's more fun, has various manifestations of snob appeal and allows general browsing, while TNLS is more confining to the immediate task. These issues, particularly philosophical, are beyond the scope of this report, but warrant further attention. The intent here is to concentrate on the practical issues of productivity in a resource sparse period, with optimism for the future. 4b2

3. Increase Support for TNLS 4c

A. Increase Terminal Availability 4c1

It is recommended that TNLS be made as attractive as possible in the office environment as well as for those who have terminals at home through the following steps: 4c1a

1) Trade all leased TI 720's for TI 735's, the new, highly portable TI (done); 4c1a1

2) Prepare 6 movable TI workstations on converted tables (from Tasker Keyboards) to be available to all staff during working hours. The special color tables would be available in the work area until wheeled into individual offices. The recommended policy is that any terminal not in use is available, and that they be freely moved in and

out of offices by anyone. These 6 terminals would have to continue to be generally available. It would help if terminals not in use were wheeled back into the work area. 4c1a2

Scouting for a terminal may take time, but it appears to be the only solution to the problems of availability, noise, privacy, and limited numbers of terminals. (The work area was found to be an unsuitable location for TI stations due to their noise and the congestion.) 4c1a2a

3) Take advantage of the TI 735 portability and require that they be brought in from home during working hours (including those not on special tables). (It has been done on a bike!) 4c1a3

B. Provide In-house Training Support 4c2

Periodic TNLS Clinics have been suggested by several persons to fill in TNLS knowledge gaps and share usage technique experiences. Addressing in particular requires a very different procedural and command logic for TNLS. One clinic has been held (covering addressing, printing and useroptions) and additional clinics should be planned as the need warrants. 4c2a

4. Establish Policy for Terminal Availability 4d

This area has become increasingly critical during the UPG survey period to the point where it may be as important a factor as DNLS response. It is the concensus that every individual's online terminal time is equally important, but that some are more equally important. The priorities for DNLS terminal usage (see above for TNLS recommendations) appear to be: 4d1

1) "Critical path" programmers
2) Programmers
3) Demonstrations for visitors
4) Other NSW
5) Applications staff (except systems programmers)
6) Learners 4d1a

It is not realistic to consider "bumping rights" except for relatively short demos. However, Applications staff could, for example, schedule themselves for 2PM or later, and not use DNLS before that time (consistent with Office-1 loading).

Similarly, non-programmer NSW people could not use terminals when either ELF or AI were down. 4d2

The most critical path programmers should have the fastest DNLS station in their offices. When that role changes, the station should be removed to a more public, but isolated place. Additional considerations should be dealt with and a general policy established that is agreed upon by all staff. 4d3

5. Support High Speed Printing 4e

At the beginning of this survey, using the printer was noted as a significant problem. Spoolers at BBN and Office-1 have minimized the difficulties, however, some recommendations remain appropriate: 4e1

a. An option to defer printing was generally desirable. It should permit the queing of the output processor and printing until evening low-load times. This would be particularly valuable to documentors whose voluminous printouts are often not needed until the next day. 4e1a

b. Delivery to offices should be made periodically during the day. This would lower the loss of printouts, particularly since the person charged with the job would have to sort through the listings. The PSO is the logical choice for this job (see section on clerical support). 4e1b

c. It is recommended that the Office-1 printer be made available to ARC staff, as well as clients. Currently Office-1 listings never reach the user, ostensibly due to lack of support. An individual at Tymshare should be placed in charge of sending non-Journal listings to the ARC PSO, who would mail or deliver them immediately. The Office-1 spooler (to ELF) should be made available to Office-1 clients in the interim. 4e1c

There are other hindrances in the printing process, e.g., the lack of a left arrow and slowness when ELF is loaded. There are no recommendations for these problems. 4e1d

6. Resources Other than NLS 4f

a. The perceived reliability and load of ELF, AI, and direct network access initially favored AI. As ELF has become more stable, it has become increasingly desirable to the point where the upper limit of 6-7 users is a problem. AI's cumbersome access is a major disadvantage; load frequently adds to the problem. 4f1

ELF limitations are being worked on, however, there is one recommendation cited by 3 persons. The login process would better be replaced by something similar to TIP connect procedures - Telnet would be called automatically. 4f1a

Network access for DNLS via the direct line to the Tymshare TIP is currently (28-MAY-75) very noisy, with frequent crashes and difficulty in resetting the LP. It is questionable whether the added speed is worth it -- the Direct Dial to TIPs from TTYs is reported to be very reliable, although there is still a considerable lag between keystrokes and printing. 4f1b

b. Personal resource rescheduling (e.g., working in shifts) was not found to be desirable, primarily due to the need to work together and to have an open work schedule. Many ARCers have chosen to work in off hours when system response is greatly improved. Working times should continue to remain flexible, as long as everyone does not try to use the system at the same time. 4f2

c. Online vs offline work allocation showed some shift toward offline work from that associated with Tasker usage, from 70% online to 10% online in one case. A shift to offline working methods can generate a conflict when our design philosophy and goals are considered. It was noted that our method of work is based on the online, highly interactive interface, and that Augmentation is in essence a shift (at least partially) to online working methods from the traditional. However, as mentioned above, the philososphical precepts of augmentation technology were not considered to be an issue here. The situation that prompted this study is considered temporary, at least in its major effects. Already, hardware-software changes (also not covered here) are being reviewed that will minimize the resource-response paucity. What is necessary to consider is the future mix of online and offline service in the context of continued economic pressure in a more realistic development world. 4f3

In view of continued pressure for the use of limited resources, longer range alternatives such as DEX were explored. Temporary measures included the hiring of temporary clerical personnel and renting typewriters (which will be suspended as the lack of demand warrants). 4f3a

d. DEX 4f4

DEX represents the great potential for extending resources. This experiment included a full time clerical person for DEX

input, setting up 2 DEX stations, and advertising the service. The demand never reached a level high enough to justify full time support, nor were the DEX stations used by ARCers. Consequently, the DEX stations are being moved to the PSO and should be used there. 4f4a

The difficulty of reading DEX tapes into TENEX was a major limitation to its usefulness. The Cassette program and the Techtran/Termicette tape machines were interrupted more than 90% of the time primarily by Net noise, thus aborting read-in. Apparently, control characters float around in the Net quite freely, particularly the subset that control the DEX functions. The only means of loading appeared to be through a direct dial line to Tymshare which was difficult to find not busy. However, Jeanne Leavitt's long hours of persistence were valuable resulting in the following recommendations. 4f4b

1) A pusher for DEX processing is needed who would ensure that the entire process up to an NLS file was completed quickly and that the user was notified of status and completion (with 1 day turn around time). 4f4b1

2) The programs and hardware should receive a thorough reworking to solve the Net interruption problem, and the excessive read rate/pause times should be minimized (details available upon request). 4f4b2

3) The DEX manual should be updated (the 2 Primers are updated). 4f4b3

4) The Techtran tape machines should be removed from the inventory. The Techtran, in addition to not working reliably, stands as the best example of the worst human factors design. Termicettes worked well, but are reportedly not serviceable on the East Coast. A search should be made for another device, particularly since we are sending them to Utility clients. 4f4b4

5) LP's should be configured to permit high speed DEX reading. 4f4b5

Other points made by respondents during the survey included some limitations: DEX is not useful for entering code, thus explaining the low demand during the "experiment"; DEX II as presently designed is too complex to be useful; DEX is not attractive for composition compared to the more flexible alternatives of paper and NLS; it is difficult to use for adding statements to existing structure - a program is

needed to merge pre-addressed DEX into an existing file; and an operator would be better suited for loading the tapes. 4f4c

The overall conclusion was that DEX could be a powerful tool for non-programming applications with some effort. 4f4d

e. Clerical Support 4f5

For the majority of ARC staff, clerical support is adequate. However, there were some problems reported. Phone answering continues to be a bothersome task that needs to be handled despite the difficulty of locating recipients. Some individuals are disturbed by calling into the work area for a recipient. 4f5a

It was not clear that typing, Xeroxing, editing, proofing, and other functions were inadequately supported. However, the perceived reluctance of the clerical staff to perform any of the above, particularly TNLS editing, was cited as a deterent to the use of this service by about 25% of those interviewed. This point may have been made primarily on the basis of experience with past clerical support. 4f5b

Recommendations: 4f5c

1. The PSO should be rearranged so that 1 person can handle all incoming calls. 4f5c1

2. DEX/TNLS stations (1 may be adequate) should be available for use in the PSO, and DEX can be the preferred mode due to the numerous interruptions (if the recommendations regarding DEX are followed). 4f5c2

3. A DEX/TNLS station should be located in a relatively isolated area to permit uninterrupted editing or text entry (e.g., in room J2028), which should be more readily available. 4f5c3

4. An attitude of work solicitation should be fostered, and those not willing to perform clerical duties should not be hired. Salaries should reflect the importance of good clerical support. 4f5c4

5. An alternative method of locating phone call recipients should be implemented. One suggestion is to have a TV camera on a call board (Chalk) in the PSO which would display the recipients name until the call was answered or not. A flashing light co-located with TV monitors in the work area and conference room would call

attention to the display. (Jake Ratliff could set this up using old Tasker equipment). 4f5c5

6. Whenever the PSO is behind in work temporary assistance should be hired. 4f5c6

Clerical support is vital to any knowledge workshop and can be potentially better utilized and integrated into an augmented knowledge workshop through the use of computer based tools by clerical personnel. 4f5d

7. Physical Working Environment 4g

The terminal work area ("bull pen") was reported by 50% of those interviewed to be too noisy both due to talking and equipment. Lighting problems were partially alleviated by replacing bulbs. Excessive interruptions while at terminals were reported by 40% of the users (10% overlap with 50% mentioned above) particularly by "priority" persons. 4g1

Recommendations (to be followed up by the DCE, JCN, RWW appointed committee: RLB and JHB). 4g2

1. New acoustically absorbent dividers, 6 feet in height are strongly recommended. 4g2a

2. The room should be arranged into small clusters of 2-3 workstations to permit teamwork, while blocking interference from the hallways. 4g2b

3. Carpet and bright colors should be added to absorb noise and enhance atmosphere. The marketing value as a showplace is an important consideration. 4g2c

This area has been neglected for the last few years, although it was once a major design concern. It is no less important now, in fact, moreso due to the much larger staff and diverse working interests. The present configuration was for a small group working on the same task in a research grant atmosphere without a marketing effort. Two users reported that productivity was reduced 25% by the noise alone. Rather than budget limitations curtailing improvements in the physical environment, it should emphasize the need to optimize working conditions. 4g3

8. Technical Bugs and Needs 4h

In addition to the system performance and resources problems,

certain bugs/needs were mentioned frequently enough to warrant inclusion. 4h1

a. DNLS Workstation Problems: 4h2

The interaction through the LP is reported to be rough, awkward, and unpredictable. The dropping of characters, the frequent need to reset under certain conditions, unnecessary screen refreshes, disfunctional simulate TTY window for some stations, excessive difficulty with keyset recognition including the "no such marker" syndrome, and the non-standardized poor quality keyboards were reported by more than 4 users. 4h2a

The later 2 problems were cited as severe limitations to productivity. Although we are all aware of the need to fix bugs, and an effort is being directed toward that, the following recommendations are worthy of additional emphasis from a productivity standpoint. 4h2b

b. Recommendations: 4h3

1. The layout of the Data Media keyboard should be the standard for all our DNLS terminals. The touch of the TI735 should be standard. The other keyboards should be returned to the manufacturer with appropriate feedback. 4h3a

Although the probability of acquiring adequate keyboards is not high, the findings indicate that significant increases in productivity would result from faster, more accurate typing. Some ARCers reported a 75% reduction in typing speed due to the keyboards. Human factors studies show that continually changing the location and feel of keys has a strong negative effect on performance. 4h3a1

2. The synchronization of the keyset and mouse controls should be changed to eliminate the "no such marker" notice, and errors in character input. 4h3b

3. The LP should be tuned to permit a user to work as fast as he can without the interference currently associated with the workstation, particularly the direct-line station. This includes such things as lessening the number of recreates, cleaning up lines, and providing identical mice and keysets for all stations. 4h3c

Technical problems that were mentioned during the survey centered on hardware and firmware, perhaps because software bugs are in the process of repair. 4h4

CONCLUSION 5

This inquiry has resulted in some concrete recommendations, based on the interview responses of a majority of ARC staff, that if implemented have a high probability of improving productivity. No recommendations were to require significant software effort, although the overall findings reflect major system problems, such as Net distance from the Host, high load average at the Host, numerous system crashes and the like. These problems are being dealt with through potential means such as Net reconfiguration, alternative Hosts, fine tuning software in Tenex (NCP), etc., as directed by management. No actions based on this report will be forthcoming pending review and direction by DCE, JCN, and RWW. 5a

The study has been a valuable learning experience and has provided a possible answer to the question: Given the current state of augmentation technology, what work methods, procedures, and peripheral factors will optimize AKW productivity? 5b

Further Study 5c

The present study has been greatly limited by resources, both those reported above and manpower. Many areas could have been persued in greater depth, both in data collection and reporting. 5c1

For example, there were no time-and-motion studies done in the formal sense. The primary means of data collection was the semi-structured interview, with minimal attention to less subjective possibilities such as stop-watch timings of throughput, TNLS-DNLS comparisons, the relationship of different average reponse times to productivity, and so on (we did acquire a stop watch, and did some preliminary timings). 5c2

Many of these kinds of techniques may be persued under the aegis of the Applications Development Group, which has as one of its four areas, User Development Test and Evaluation. The limiting factor will be support, which has heretofore been weak for any kind of analysis. 5c3

APPENDICES 6

I. List of ways to improve DNLS performance: 6a

A. See the "scriptographic" booklet handed out to all staff (a few are still available if you did not get one). 6a1

B. What ARC Users do for faster DNLS 6a2

These are "tricks of the trade" that can increase online performance as indicated by those ARCers interviewed. 6a2a

(1) Split the screen so that only half or less of the screen needs to be recreated when the view is changed. 6a2a1

(2) Use smaller statements when editing is necessary. 6a2a2

(3) Use the "defer recreate" viewspec (v) and edit from the bottom of the screen. 6a2a3

If one works sequentially from bottom up, right to left, the changes need not be shown until a display full of editing has been completed...very carefully. 6a2a3a

(4) Use viewspecs to filter/clip what is not necessary to the current editing/viewing: "g" , "l" , "p" , and "x" , etc. 6a2a4

(5) Use scope TNLS when possible on a DNLS terminal. 6a2a5

(6) Use simple L-10 programs for repetitive editing. 6a2a6

(7) Use the display primarily for statement editing, otherwise use TNLS for composition/text editing, restructuring (with SIDs), certain coding/debugging, where TTY windows are needed, where reliability is vital. 6a2a7

(8) Set Viewspecs in Useroptions to be "xa" so that there is no need to paint the screen upon login -- you can immediately load the file you are going to use. 6a2a8

(9) Use TNLS for everything except statement editing, structure viewing, and certain debugging. 6a2a9

(10) Print with SIDs, mark printout with edits/restructuring, and then use TNLS for everything except single statement editing. 6a2a10

II. Interview Prompt Sheet 6b

Plans and expectations for changes that affect productivity 6b1

Overall productivity 6b1a

Optimizing Online Performance 6b2

Optimizing Performance when using TNLS 6b2a

Optimizing Performance when using DNLS 6b2b

Useroption variations affecting performance 6b2c

typing ability 6b2d

TNLS vs DNLS 6b3

Tasks that are better suited for TNLS 6b3a

Tasks that are better suited for DNLS 6b3b

Printing 6b4

ARC printer use instructions clarity and printer usefulness 6b4a

Printer Uses -- enhance effectiveness? 6b4b

What about print file cueing (for late night printing) 6b4c

Policy for Resource Allocation 6b5

DNLS terminal availabilty 6b5a

TI availability 6b5b

ELF vs NET vs AI performance 6b5c

Time of day usage -- scheduling 6b5d

Personal Resource/Activity Scheduling 6b6

What are the load patterns at BBNB and Office-1? 6b6a

Rearrangment of work patterns/activities for better performance 6b6b

Online vs offline percentages 6b6c

Document Preparation 6b7

The initial composition; DEX Usefullness 6b7a

The Use of Non-NLS tools 6b8

Move msg vs RD and Readmail 6b8a

Typewriters, use if available 6b8b

Clerical support use and availability 6b8c

Other: 6b8d

The Physical Working Environment 6b9

Noise interference 6b9a

Technical bugs and needs (send to FEEDBACK) 6b10

III. Terminal Landscape Study by RA3Y 6c

Note: Terminal landscape refers to the location, type, and usage of the terminals in the work areas. The study was to be the periodic observation of terminal usage with particular attention to relationships among the above factors (e.g., did location correlate with workstation usage?). 6c1

THE TERMINAL LANDSCAPE STUDY by RA3Y 6c2

Due to our horrendous downtime problems, we could not assess how heavily our displays are being used. Two findings did, however, emerge. 6c3

1. Few people are using terminals before about 9:15 a.m. 6c3a

2. Many people are walking away without logging out. As a result, people who need terminals cannot tell if a terminal is open or if the user has just stepped away for a few moments. 6c3b

These findings suggest that people should begin work at 8:00 a.m. and that users should "clear" the terminal when they are finished, by logging out of ELF or AI or by closing the network connection on the direct line to the TIP. 6c4

IV. Links to interim reports 6d

JHB 9-APR-75 20:58 32279
User Productivity Group Status Report for April 3 through 8
Location: (JJOURNAL, 32279, 1:w)
*****Note: Author Copy*****
6d1

Comments: DEX stuff needed and terminals for use.... 6d1a

JHB 8-APR-75 20:58 32273
User Productivity Report for April 1 and 2
Location: (JJOURNAL, 32273, 1:w)
*****Note: Author Copy*****
6d2

Comments: DEX input and the need for TI stations.... 6d2a

JHB 1-APR-75 11:52 32237
User Productivity Group Report for 31 Mar 75
Location: (JJOURNAL, 32237, 1:w)
*****Note: Author Copy*****
6d3

Comments: If you have a TI 720 or can use some DEX support, this may be of particular interest. 6d3a

JHB 28-MAR-75 13:00 32207
User Productivity Group Report for 28 Mar 75
Location: (JJOURNAL, 32207, 1:w)
*****Note: Author Copy*****

6d4

JHB 27-MAR-75 11:41 32201
User Productivity Group Report for 26 Mar
Location: (JJOURNAL, 32201, 1:w)
*****Note: Author Copy*****

6d5

V. Link to Interview Data Base 6e

Interviewee responses are listed under the appropriate categorvin the file -- office-1,bair,data,1) (unedited, raw data) 6e1

LAC 4-JUN-75 05:40 32658

COBOL EXAMPLE PROGRAM

Example of a COBOL program structured into an NLS format for easy retrieval and manipulation. This is provided as per your request, and should be looked at as one (of many possible)suggestions for how the program might be structured. I do feel that, for understandability and easy manipulation, a standard format is required.

/Larry

```
1 IDENTIFICATION DIVISION.                                              1
  1a PROGRAM-ID. <predef character><4 ch ident><0-9,then A-Z>            1a
  1b AUTHOR. <Authors name><organization><project>                       1b
  1c INSTALATION. AFDSDC B4700.                                         1c
  1d DATE-COMPILED. <version date of source file, replaced by
     compiler>                                                          1d
  1e REMARKS. <0-level statement, except MONITOR statement>             1e
2 ENVIRONMENT DIVISION.                                                 2
  2a CONFIGURATION SECTION.                                             2a
    2a1 SOURCE-COMPUTER. B4700.                                         2a1
    2a2 OBJECT-COMPUTER. (B4700 / B3500).                               2a2
    2a3 [SPECIAL-NAMES. <special name redefinition if required>]        2a3
  2b INPUT-OUTPUT SECTION.                                              2b
    2b1 FILE-CONTROL.                                                   2b1
      2b1a SELECT <file assignment>                                     2b1a
      2b1b ....                                                         2b1b
    2b2 I-O-CONTROL.                                                    2b2
      2b2a [RERUN ..]                                                   2b2a
      2b2b [SAME ..]                                                    2b2b
      2b2c [MULTIPLE FILE ..]                                           2b2c
      2b2d [APPLY ..]                                                   2b2d
3 DATA DIVISION.                                                        3
  3a FILE SECTION.                                                      3a
    3a1 FD <filename-1>.                                                3a1
      3a1a <record-name-1>.                                             3a1a
```

COBOL EXAMPLE PROGRAM

```
            3a1a1 <data-name-1>.                                    3a1a1
               3a1a1a <dataname-2>.                                 3a1a1a
                  3a1a1a1 <dataname-3>. and so on                   3a1a1a1
                  3a1a1a2 ...                                       3a1a1a2
               3a1a1b ...                                           3a1a1b
            3a1a2 ...                                               3a1a2
         3a1b [<record-name-2>. redef's r-n-1                       3a1b
            3a1b1 ...                                               3a1b1
      3a2 [FD <filename-2>.]                                        3a2
      3a3 ...                                                       3a3
      3a4 [SD <file-name-n>.]                                       3a4
   3b WORKING-STORAGE SECTION.                                      3b
      3b1 [77 dataname [VALUE val] [PIC pic].]                      3b1
      3b2 ...                                                       3b2
      3b3 dataname [VALUE val] [PIC pic].                           3b3
         3b3a dataname [VALUE val] [PIC pic].                       3b3a
            3b3a1 dataname [VALUE val] [PIC pic].                   3b3a1
               3b3a1a dataname [VALUE val] [PIC pic].               3b3a1a
                  3b3a1a1 etc.                                      3b3a1a1
               3b3a1b ...                                           3b3a1b
            3b3a2 ...                                               3b3a2
         3b3b ...                                                   3b3b
      3b4 [dataname.]                                               3b4
         3b4a [...]                                                 3b4a
      3b5 ...                                                       3b5
```

```
      3b6 [88 condition-name VALUE literal.]                          3b6
      3b7 ...                                                         3b7
      3b8 [66 dataname RENAMES dataname.]                             3b8
      3b9 ...                                                         3b9
4 PROCEDURE DIVISION.                                                 4
   4a Paragraph-name.                                                 4a
      4a1 Sentence-1.                                                 4a1
      4a2 Sentence-2.                                                 4a2
      4a3 ...                                                         4a3
   4b Paragraph-name-2.                                               4b
      4b1 ...                                                         4b1
   4c ...                                                             4c
   4d ...                                                             4d
   4e END-OF-JOB.                                                     4e
5 [COMPILATION-PARAMS] (added after compile)                          5
   5a compile information                                             5a
   5b address information        low addr      high addr      len
   (digits)                                                           5b
      5b1 reserved memory        nnnnnn  nnnnnn  nnnnnn               5b1
      5b2 data division nnnnnn   nnnnnn  nnnnnn                       5b2
      5b3 fixed segment constants       nnnnnn  nnnnnn  nnnnnn       5b3
      5b4 fiixed segment instructions   nnnnnn  nnnnnn  nnnnnn       5b4
      5b5 input output buffers   nnnnnn  nnnnnn  nnnnnn               5b5
      5b6 stack nnnnnn  nnnnnn  nnnnnn                                5b6
      5b7 disk file headers      nnnnnn  nnnnnn  nnnnnn               5b7
```

COBOL EXAMPLE PROGRAM

(J32658) 4-JUN-75 05:40;;;; Title: Author(s): Lawrence A. Crain/LAC;
Distribution: /EKM([ACTION]) ; Sub-Collections: NIC; Clerk: LAC;
Origin: < CRAIN, COBOL-XMPL-PROG.NLS;3, >, 13-MAR-75 07:02 LAC ;;;;

JJZ 4-JUN-75 10:28 32659

sendmail try

1 dear frank
this is an attempt to send mail from a branch in my file
please respond if it gets to you JJZ. 1

JJZ 4-JUN-75 10:28 32659

sendmail try

(J32659) 4-JUN-75 10:28;;;; Title: Author(s): John J. Zenor/JJZ;
Distribution: /FGB([ACTION]) JJZ([INFO-ONLY]) ; Sub-Collections:
NIC; Clerk: JJZ;

JGN 4-JUN-75 11:06 32660

ELF INFO RECIEVED

1 WE GOT YOUR TRANSMITTAL OF THE ELF FILE -- INTACT THIS TIME.
THANKS.
ONWARD. GREG 1

JGN 4-JUN-75 11:06 32660

ELF INFO RECIEVED

(J32660) 4-JUN-75 11:06;;;; Title: Author(s): J. Gregory Noel/JGN;
Distribution: /FGB([ACTION]) ; Sub-Collections: NIC; Clerk: JGN;

Proposed Working Group Meeting

FGB 4-JUN-75 12:18 32661

Please respond to FGB & ILA. Thanks.

FGB 4-JUN-75 12:18 32661

Proposed Working Group Meeting

1 We have tentatively scheduled an Implementation Group meeting on July 7-8 in Monterey. This will immediately precede the NLCC meeting. Please acknowledge receipt of this message and let us know if these dates are acceptable. Thanks. 1

FGB 4-JUN-75 12:18 32661

Proposed Working Group Meeting

(J32661) 4-JUN-75 12:18;;;; Title: Author(s): Frank G. Brignoli/FGB; Distribution: /NAVIMP([ACTION]) ; Sub-Collections: NIC NAVIMP; Clerk: FGB;

WHY LOUSE UP A WEEKEND

1 1

WHY LOUSE UP A WEEKEND

PCB 4-JUN-75 17:32 32662

(J32662) 4-JUN-75 17:32;;;; Title: Author(s): Paul C. Bishop/PCB;
Distribution: /FGB([ACTION]) ILA([ACTION]) JDB2([INFO-ONLY])
; Sub-Collections: NIC; Clerk: PCB;

PCB 4-JUN-75 17:37 32663

WHY MESS UP A LONG WEEKEND?

1 MY CALENDAR SAYS 7-8 JULY COME AFTER FOURTH OF JULY WEEKEND...MAKING IT NECESSARY TO TRAVEL ON SUNDAY OF SAME LONG WEEKEND...8-9 JULY SEEM MUCH BETTER FOR ME....OR EVEN 9-10...BUT I MUST BE BACK ON EAST COAST US ON 12-13...AND PLAN TWO WEEKS AL AFTER THAT....OTHERWISE..DATES ARE OK FOR ME....REGARDS, PAUL. 1

PCB 4-JUN-75 17:37 32663

WHY MESS UP A LONG WEEKEND?

(J32663) 4-JUN-75 17:37;;;; Title: Author(s): Paul C. Bishop/PCB;
Distribution: /FGB([ACTION]) ILA([ACTION]) JDB2([INFO-ONLY])
; Sub-Collections: NIC; Clerk: PCB;

SAI TASK 75-16

1 The attached task statement is provided to support SAI work under AO 2886 and Amendment 1 to AO 2886. 1

2 TASK 75-16 2

3 Planning Assistance for Demonstration of the National Software Works at Gunter AFB, Alabama 3

4 OBJECTIVE: Support the ARPA IPTO National Software Works program by analyzing whether the initial experiments aimed at applying the National Software Works concept to the development of Air Force systems to run on the Burroughs B4700 will be perceived as a success by the users of the system, the implementors of the components, and the sponsors of the effort. 4

5 BACKGROUND: An early and important step in applying National Software Works concepts to the challenge of enhancing the software pro- duction process in the U.S. Air Force will be taken in the Summer of 1975. A special frontend computer will be installed at the Air Force Data Systems Design Center at Gunter Air Force Station, Alabama to connect the Burroughs B4700 at that location to the ARPANET and the National Software Works. Software will be installed in the PDP-11 and B4700 at Gunter and in PDP-10 computers on the ARPANET aimed at supporting the interactive creation, debugging and execution of COBOL programs for the Burroughs computer. 5

6 An analysis of the current states of the NSW development activities, and of the organizational and environmental conditions at Gunter Air Force Station is needed to determine if the initial experiences with the National Software Works will be perceived as a success by the users of the system, the implementors of the components, and the sponsors of the effort. The study will reveal whether modifications to current plans are required for the success of this critical step. 6

6a TASK: (a) Study the actual state of the component hardware and software parts, and the state of preparation of the necessary interfacing hardware and software and the adequacy of development plans in near-term (July 1 1975 to March 31, 1976). 6a

6a1 (b) Survey of user expectations and state of preparation for use of the system. Included will be a study of the experience and training of the initial user subgroups, means established for communicating positive and negative experiences to subsequent users and to contractors, established measures of completeness and success, etc. 6a1

6a2 (c) Analysis of the returns from subtasks (a) and (b), based largely on prior experience. 6a2

6a3 (d) Preparation of a written report of findings and recommendations. 6a3

7 RESOURCES: It is estimated that fifty-three man days of consultant effort, 20 man hours of SAI professional staff effort, and 20 man hours of technical typist effort will be required. The estimated cost of these services is 19,850. 7

8 ------- ------- ------- 8

SAI TASK 75-16

(J32664) 4-JUN-75 18:22;;;; Title: Author(s): David C. Russell/DCR2; Distribution: /EJK([ACTION]) WEC([INFO-ONLY]) DCR2([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: DCR2; Origin: RUSSELL, SAI/TASK75-16.NLS;2, >, 4-JUN-75 18:07 DCR2 ;;;;####;

KIRK 4-JUN-75 18:58 32665

bug in dnls literal collection

1 There is a bug in dnls literal collection whenever backspacing the first two words of the second line and then the last word of the first line and then typing a word that must wrap around. For example, process the following statement. 1

1a i Ins Sta Watch what happens when I backspace the words at the end of the line here and then tryextemporanously to continue typing. 1a

KIRK 4-JUN-75 18:58 32665

bug in dnls literal collection

(J32665) 4-JUN-75 18:58;;;; Title: Author(s): Kirk E. Kelley/KIRK; Distribution: /FEED([ACTION]) CHI([INFO-ONLY] In case you are using a copy of this code for NSW) ; Sub-Collections: SRI-ARC; Clerk: KIRK;

KIRK 4-JUN-75 19:02 32666

Bug in recreation with viewspec y

1 Whenever a statement is shortened via delete text or whatever enough to make in one line shorter, garbage that is not really there but very confusing is left over where the blank line should be. This should be easy to fix by simply adding a line of blanks whenever y is on and a statement is being recreated to the end. 1

KIRK 4-JUN-75 19:02 32666

Bug in recreation with viewspec y

(J32666) 4-JUN-75 19:02;;;; Title: Author(s): Kirk E. Kelley/KIRK; Distribution: /FEED([ACTION]) ; Sub-Collections: SRI-ARC; Clerk: KIRK;

KIRK 4-JUN-75 21:37 32667

Handling comment properties

1 It is my understanding that except for the problem of specifying the user interaction, it would be rather easy to implement several greatly needed properties. In particular output processor directives, links, backlinks, and comments that could be made to appear and disappear. 1

2 I would propose the following for maximum flexibility and upward compatabilityness. This also seems to me the simplest first-pass implementation. 2

3 One comment property handles directives and links as well as general comments. 3

4 There should be a Comment textual entity (perhaps called "Reference" because c is being used for character?) for all of the editing commands and there should be a "Designate Comment (on) DESTINATION (with) STRING/STRUCTURE (at) SOURCE" command to set existing text to be a comment. 4

5 When turned on, the comment appears in the statement immediately after where the user pointed when inserting or designating the text of the comment. 5

6 No characters visible to the user should be automatically added to the text of a statement. If the user wants to indicate the presence of a comment, it is his/her responsibility to do so. Conventions might be to place an ^ in the text preceeding a link, * preceeding a comment, to not place anything to indicate a directive. But this is up to the user. 6

7 There should be a "Turn comments on/off" command and viewspec. Given the following uses for viewspecs, capital S and capital T should do for comments on and comments off respectively (lowercase s means show all lines, lowercase t means show one line only). 7

8 M menu numbers on (instead of statement numbers or SIDs)
N
O seq gen on
P seq gen off
Q relative indenting on
R
S show comments
T don't show comments
U
V
W warp on
X all warps off
Y
Z 8

Handling comment properties

9 A indenting on
B indenting off
C names on
D names off
E TNLS paginate when printing
F TNLS no paging/DNLS recreate display
G numbers right
H numbers left
I SIDs on
J SIDs off
K signatures on
L signatures off

9

Handling comment properties

(J32667) 4-JUN-75 21:37;;;; Title: Author(s): Kirk E. Kelley/KIRK;
Distribution: /ARC-DEV([INFO-ONLY]) ; Sub-Collections: SRI-ARC
ARC-DEV; Clerk: KIRK;

JHB 4-JUN-75 22:07 32668

Some Highlights of SRI Quarterly review, 4-JUN-75

A few paragraphs briefly covering Anderson's report.

1 Some Highlights of SRI Quarterly review, 4-JUN-75 1

1a Overall revenues have increased satisfactorily. 1a

1a1 DOD revenues have dropped slightly. 1a1

1a2 Non-DOD revenues have increased, and, for the first time in the history of SRI, exceed those from DOD. 1a2

1a3 Commercial revenues have increased nicely, representing a continuing trend toward this source of contracts. 1a3

1a3a (Increases are measured for the comparable period in 1974, and are on the order of millions.) 1a3a

1a4 Overall Net income has decreased (on the order of ten thousands), reflecting a continuing, undesirable trend. The point at which SRI becomes a losing operation is reported to be uncomfortably close. 1a4

1b Two new building projects have been approved and will begin shortly. An addition to the Life Sciences Building and a new building directly behind Building I (to replace many of the temporary buildings) are scheduled for completion by 1977. 1b

1b1 (The fresh fruit and pastries were better than ever). 1b1

JHB 4-JUN-75 22:07 32668

Some Highlights of SRI Guarterly review, 4-JUN-75

(J32668) 4-JUN-75 22:07;;;; Title: Author(s): James H. Bair/JHB;
Distribution: /SRI-ARC([INFO-ONLY]) ; Sub-Collections: SRI-ARC;
Clerk: JHB;

David A. Potter
Educational Testing Service
Rosedale Road
Princeton, New Jersey 08540

To:
Access Copy

326691ch I had comm

so I didn't know you wanted more feedback -- sorry. You might take a look at the modified version I'm preparing for internal ETS use, particularly the section on Len Swanson. As for the names, do a show record for ident ETS to get a complete list.

APPLICATION DESCRIPTION: ETS
(Educational Testing Service, Princeton) 1

Introduction 2

This paper reviews the progress made over the past six months toward the development at ETS of an active NLS user group. The intent is to document the uses to which NLS is currently being put, in order to enable us to effectively evaluate its userfulness. 2a

Currently, NLS is being put to three major uses at ETS: document production and correspondence; data base construction and management, including bibliographies; and instrument construction. 2b

The following descriptions include application strategies, generalizable descriptions of the specific uses of NLS, and a content specific description of the work being done. 2c

Correspondence 3

Correspondence is written in the usual manner using NLS editing functions. The output is intended for non-NLS users, and therefore must be formatted for hardcopy printing. The formatting was done manually until recently when a special program was written called ETSMEMO (currently in directory <meyer>). 3a

Special User Program: 3b

ETSMEMO is a Class 3 (unsupported) program that will produce an ETS interoffice memo format from an NLS file. It attaches a subsystem that has the command "Insert Format". A predetermined set of Output Processor directives are inserted in the file with prompting for sender's ident and the names (non-NLS users) of the recipients and copy recipients. CRs are used to separate the names and activate the directives for centering. The date is added as are the labels for "TO", "CC:", Date:", Subject", and "From:". The subject and the sender's ident are entered by the user when prompted. 3b1

Printing is currently done with a Memorex terminal, IBM selectric type terminals, and with a TI 735. The output terminal printout on TI paper actually provides reasonably high quality when offset printed. This provides a quick way of producing copy acceptable to the outside world without any special equipment. 3b2

Document Production 4

Report on Health Planning (Walton, Fortna, et al) 4a

A large report concerned with the technical assistance needs of the Public Health Service is being written in part through NLS. The project will discuss the Public Law requirements for a Center for technical Assistance to the Health Service. The report must be written with input and review from several geographically distributed contributors. Thus, NLS will be ideally suited to the numerous revisions that will be collected initially via phone converations with Barbara Esser, who is supervising the report preparation. 4a1

Len Swanson has developed and implemented a number of interesting applications: 4b

1. Committee selection 4b1

The system is being used to record and maintain information on people who are being considered for membership on a committee. The names were originally entered from notes and memos suggesting nominees. After sorting the names, addresses and information about each nominee were entered. Periodically additional information was added. The aggregate list was then printed so that several people could "rate" the nominees and selct their top choices. The consensus of these choices were then culled from the original file and put into a second file, which will be used to record expanded biographical data and prepare a summary report listing the desired names in order of selection. 4b1a

2. Mailing List 4b2

Len Swanson is about to use the system to enter a 700 name mailing list and sort it (geographically) in order to remove duplicates. The result will be used to prepare mailing labels for distribution of project reports, and to produce listings of subsets of names. He expects to maintain the mailing list on OFFICE-1 (i.e., to add to it and make address changes). 4b2a

3. Book 4b3

Len and two associates are beginning work on a textbook, and they expect to use the system, at least in part, for preparation of the text. Len has entered a topical outline, with notes; they will subsequently divide the list of chapters and work independently on each, but with review, comments, and modifications by the other two authors. 4b3a

4. Report 4b4

Len has used the system to prepare several working documents and one (brief) formal report. The report was prepared in several stages, with intermediate external review. The first step was to enter the topics (sections and subsections) and basic content. He next wrote sections (at random) as they occurred to him. After two editings and one restructuring of the file it was prepared for output and distribution. The result is now being reviewed and will probably be further modified before final printing. 4b4a

5. Joint Papers 4b5

Loraine Sinnott and Len Swanson are working on three documents which they expect to prepare jointly. Initial drafts of each have been entered by Len, and Lorraine will modify them and/or suggest changes through the system. 4b5a

6. TRAIDEX scratch pad (information management) 4b6

Len has created a file to maintain miscellaneous information related to one of his projects. The file contains a list of key people (with addresses and phone numbers) related to the project, a bibliography of relevant reports and documents, a set of notes on various phases of the project, and a list of project milestones and date-related events. 4b6a

CBI Data Base (Anastasio, Sinnott) 5

The CBI (Computer Based Instruction) community is planning to use an NLS data base of literature in CBI. Loraine Sinnott is continuing the entry of citations in a data base that is to be searched by keyword, author, titleword, and the usual NLS search functions. This may be done with the catalog production programs --- the data base was

started using the tagged field format necessary for the programs. 5a

Sex Differences and Discrimination in Education Data Base (Harris, Ekstrom, Lockheed) 6

Currently 470 bibliographic citations extracted from other more general data bases have been entered in a single file for searching using the standard NLS search functions, particularly content filters. Searching is done by author, titlewords, journal, date, and the other elements of a standard bibliographic entry (Pschological Abstracts Format). 6a

[Citation sample:] Abel, H. And Sahenkaya, R. Emergence of sex and race friendship preferences. CHILD DEVELOPMENT, 1962, Vol. 33, 939-943. 6a1

Abstracts are available and it is planned to enter them in a separate file linked to the appropriate citation in the bibliography. This would form the basis of a free text search and retrieval function on the abstracts. 6b

Abi Harris is building the data base in the <RUM_AR> directory. 6b1

Volunteer Activities of Women Data Base (Harris, Lockheed, Ekstrom) 7

This bibliographic data base of 34 items is part of a study to evaluate and analyze the volunteer activities of women to establish a means of assigning academic credit to those activities. 7a

Teacher Behavior Research (Potter) 8

Online Teacher Behavior Data Base 8a

David Potter is working in the area of educational assessment, developing evaluative tools and instruments for the assessment of teacher behavior in the public schools. The methodologies are sociometric and involve various techniques common to social psychology, e.g., shadowing, case studies, interviews, and questionnaires -- the latter using the online index. 8a1

The online index is a structured list of statements that describe the behavior of teachers in the classroom. It is based on the "Florida Catalog of Teacher Competencies". 8a2

The index is accessed through a locator modeled after the Locator in Userguides at Office-1. It is not limited to teacher behavior, and includes additional top level headings such as Pupil Level, Object of Change, etc., and Teacher Behavior. Each of the 8 categories has lower level headings such as Developing Personal Skills, Performing Administrative Duties, etc. The next level contains more specific behavior categories such as Accepting Responsbility, Confering with parents, Motivating /Reinforcing Students, and so on. 8a3

Instrument Development 8b

The online teacher behavior data base described above is being used by Potter to develop questionnaires, rating scales, and other instruments to be used in his Job Analysis of Teaching project. Use of the system in this manner has allowed working copies of these instruments to be produced quickly and efficiently, which enables him to make much better use of outside review than is the case when each instrument -- and all revisions thereof -- must be typed separately. 8b1

Questionnare scales are added to the item list using the copy command to copy the scale to each questionnaire item. (This is an excellent example of the applicability of an L-10 capability -- to accomplish this reiterative copy with one command, "Copy STRUCTURE (to follow) every statement in STRUCTURE). 8b2

Example of question item with scale (instructions are added to the beginning of each questionnaire of course): 8b3

[Heading =] PLANNING INSTRUCTION 8b3a

8. Selecting and specifying goals, aims, and objectives

```
Time Teachers |        |        |        |        | Hours/
SHOULD Spend  |....|....|....|....|....|....|....|....| Month

Time Teachers |        |        |        |        | Hours/
DO Spend      |....|....|....|....|....|....|....|....| Month

Time          |        |        |        |        | Hours/
YOU Spend     |....|....|....|....|....|....|....|....| Month
              0        10       20       30       40
```

8b3b

Directives are used in the questionnaires and are

inserted manually due to the highly structured nature of the questionnaire. One difficulty is encountered in the use of the directive .Plexnum; which will number every statement in a plex sequentially, e.g., 1. 2.... This is perfect for questionnaires except for the fact that all the questions are not in one plex. The headings ("Planning Instruction" in the above case) are logically at a higher level, yet the questions they subsume must be numbered from the beginning of the questionnaire. This limitation has been circumvented by putting the headings of other questionnaires at a level below the questionnaire items. 8b4

Other Questionnaires are constructed from the locator using different scales. For example, the respondents are asked to rate the importance of each category: 8b5

8. Selecting and specifying goals, aims, and objectives 8b5a

Not at all 1 2 3 4 5 Extremely
Important.....|.....|.....|.....|.....|.....Important
8b5a1

The Work Diary, also created from the locator category list, is best described by including the instructions for the respondent: 8b6

"This work diary is intended to help us understand how you spend your time as a teacher -- that is, how is your time distributed across the 44 teaching tasks listed below? We would like you to fill this form out three times a day: (1) around noon, to tell us how you spent the morning; (2) at the end of the school day, to describe the afternoon; and (3) around the end of the evening, so we can find out what job-related tasks you've been working on since the end of the school day. [Check the appropriate category:] 8b6a

[Example:] PERFORMING ADMINISTRATIVE DUTIES 8b6a1

23._____Supervising aides, tutors, etc. 8b6a1a

24._____Arranging physical environment 8b6a1b

(There are 44 statements total in the questionnaire under approximately 12 headings.) 8b6a1c

The Critical Incident Record Form (Type I) uses an open ended questionnaire design that when generated from NLS allows the reiteration of the instrument design to proceed without re-keying the highly formatted pages (produced by manually inserted directives). Example of instructions and questionnaire item: 8b7

"Think back over a period of time (six months or so) long enough for you to have observed the activities of all your teachers. Focus your attention on any one thing that one of your teachers may have done which made you think of him/her as an outstandingly good or very effective teacher. In other words, think of a critical incident which has added materially to the overall success of your school or department. Please do not record any names of persons involved in the following incident.

What were the general circumstances leading up to this incident?" 8b7a

Document Composition and Production 8c

Potter has for some months been doing virtually all of his writing on the system. This has included proposals, reports, letters, and memoranda. 8c1

General comments: 9

The ETS architect's general intent is, at least in part, the augmentation of clerical functions. It may be that additional capabilities have been added that would take an unreasonably large task force of clerical personnel, and therefore would not have been accomplished outside of an AKW. The typing of questionnaires with scales is laborious at best, while the repetative functions can be easily

accomplished in NLS. The job would become odious if there were numerous revisions necessitating complete retyping of the questionnaires each time. This editing augmentation is extended beyond the traditional word processing systems when the data bases, locator, and automatic generation of special subsets are considered. 9a

In sum, ETS's application includes questionnaire production and bibliographic storage, search and retrieval, in addition to the usual functions of communication, and document composition and production. 9b

FGB 5-JUN-75 05:31 32670

Mail Received

1 John, your send mail attempt from branch in file got here fine.
Regards. Frank 1

FGB 5-JUN-75 05:31 32670

Mail Received

(J32670) 5-JUN-75 05:31;;;; Title: Author(s): Frank G. Brignoli/FGB; Distribution: /JJZ([ACTION]) ; Sub-Collections: NIC; Clerk: FGB;

Some Feedback Statistics for March - Would you like more?

1 Because of our own interest in how feedback was being used, User Services compiled the following statistics on the feedback submitted in March 1975. The messages and responses were organized in a file so answers followed questions. We wondered if Architects would be interested in such statistics on a monthly basis and/or access to the file containing reorganized questions and answers. (The one for March was about 100 pages.) References to passwords would be removed if the file were to be more public. 1

2 Let us know what you think so as we do other months we'll know who to make it available to. 2

3 LIST OF USAGE BY SUBSCRIBER 3

3a The following categories for incoming messages are information copies, problems/questions about the system, bug reports, and directory/ident requests. The total is the total number of messages generated by that particular group of users. The number of users indicates the number of people from that group who submitted messages to feedback. 3a

3b subscriber		info-cop	prob-ques	bugrep	dir/idreq	total	3b
3c ARC-APP	10 users	64	25	3	18	110	3c
3d ARC-DEV	7 users	13	6	10	0	29	3d
3e ARC-MGT	1 user	2	0	0	0	2	3e
3f ARPA	2 users	0	3	0	0	3	3f
3g ARPA-NSW	6 users	6	10	0	8	24	3g
3h BELL	2 users	1	4	0	1	6	3h
3i BRL	2 users	2	2	0	0	4	3i
3j ETS	3 users	7	6	0	3	16	3j
3k MIT-SEISMIC	1 user	1	3	1	6	11	3k
3l NSA	3 users	0	2	1	0	3	3l
3m NSRDC	5 users	2	5	1	8	16	3m
3n OPERATORS	5 users	18	1	0	2	21	3n
3o RADC	6 users	15	7	1	1	24	3o

Some Feedback Statistics for March - Would you like more?

3p SRI 2 users 1 2 0 3 6 3p

4 BREAKDOWN OF FEEDBACK STATISTICS 4

4a 54 persons sent messages to feedback in March 1975. 4a

4b Of these 54 users, 36 or two-thirds of the users were clients. 4b

4c The total number of messages received was 275. 4c

4d 113 or 41% of these were from clients. 4d

4e Users were categorized by length of time using NLS as follows: new = 1-4 mos., medium = 4-12 mos., and old = more than 12 mos. There were 9 new, 15 medium, and 30 old users that submitted messages. 4e

SGR 5-JUN-75 07:35 32671

Some Feedback Statistics for March - Would you like more?

(J32671) 5-JUN-75 07:35;;;; Title: Author(s): Susan Gail Roetter/SGR; Distribution: /KWAC([ACTION]) PKA([INFO-ONLY]) SLJ([INFO-ONLY]) ; Sub-Collections: SRI-ARC KWAC; Clerk: SGR; Origin: < ROETTER, ARCHCP.NLS;3, >, 5-JUN-75 07:33 SGR ;;;;####;

EJK 5-JUN-75 08:19 32672

VERSION THREE: Getting to NLS on the IMLAC with the new TENEX 1:33

If you don't use the IMLAC forget it!

EJK 5-JUN-75 08:19 32672

VERSION THREE: Getting to NLS on the IMLAC with the new TENEX 1:33

1 Until modified by SRI the following procedures are necessary to use the IMLAC in the IMLAC mode. 1. login 2. Type wid 62<cr> 3. Type term<sp>lv<esc><cr> (I'm not sure you need the <esc> try it) 4. Type nls<cr> 5. After the seven appears in the numbers on the top of the screen ie. 003000780, use the control 6 so that the numbers read 003006780. 6. Carry on. NOTE: It will be necesary to use the control 7 to get rid of the seven when you go to TENEX. ALSO, it does not appear to me to be possible to get to TENEX using the control C. You literally have to use the command GOTO TENEX. 1

EJK 5-JUN-75 08:19 32672

VERSION THREE: Getting to NLS on the IMLAC with the new TENEX 1:33

(J32672) 5-JUN-75 08:19;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /RADC([ACTION]) JCP([INFO-ONLY]) JCN([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

SAI Task 75-16

1 The attached task statement is provided to support SAI work under AO 2886 and Amendment 1 to AO 2886. 1

2 TASK 75-16 2

3 Planning Assistance for Demonstration of the National Software Works at Gunter AFB, Alabama 3

4 OBJECTIVE: Support the ARPA IPTO National Software Works program by analyzing whether the initial experiments aimed at applying the National Software Works concept to the development of Air Force systems to run on the Burroughs B4700 will be perceived as a success by the users of the system, the implementors of the components, and the sponsors of the effort. 4

5 BACKGROUND: An early and important step in applying National Software Works concepts to the challenge of enhancing the software pro- duction process in the U.S. Air Force will be taken in the Summer of 1975. A special frontend computer will be installed at the Air Force Data Systems Design Center at Gunter Air Force Station, Alabama to connect the Burroughs B4700 at that location to the ARPANET and the National Software Works. Software will be installed in the PDP-11 and B4700 at Gunter and in PDP-10 computers on the ARPANET aimed at supporting the interactive creation, debugging and execution of COBOL programs for the Burroughs computer. 5

6 An analysis of the current states of the NSW development activities, and of the organizational and environmental conditions at Gunter Air Force Station is needed to determine if the initial experiences with the National Software Works will be perceived as a success by the users of the system, the implementors of the components, and the sponsors of the effort. The study will reveal whether modifications to current plans are required for the success of this critical step. 6

6a TASK: (a) Study the actual state of the component hardware and software parts, and the state of preparation of the necessary interfacing hardware and software and the adequacy of development plans in near-term (July 1 1975 to March 31, 1976). 6a

6a1 (b) Survey of user expectations and state of preparation for use of the system. Included will be a study of the experience and training of the initial user subgroups, means established for communicating positive and negative experiences to subsequent users and to contractors, established measures of completeness and success, etc. 6a1

6a2 (c) Analysis of the returns from subtasks (a) and (b), based largely on prior experience. 6a2

6a3 (d) Preparation of a written report of findings and recommendations. 6a3

7 RESOURCES: It is estimated that fifty-three man days of consultant effort, 20 man hours of SAI professional staff effort, and 20 man hours of technical typist effort will be required. The estimated cost of these services is 19,850. 7

8 ------- ------- ------- 8

SAI Task 75-16

(J32673) 5-JUN-75 10:49;;;; Title: Author(s): David C. Russell/DCR2; Distribution: /EJK([ACTION]) DCR2([INFO-ONLY]) WEC([INFO-ONLY]) ; Sub-Collections: NIC; Clerk: DCR2; Origin: RUSSELL, SAI/TASK75-16.NLS;2, >, 4-JUN-75 18:07 DCR2 ;;;;####;

PWO 5-JUN-75 11:13 32674

missing messages

1 Dirk, I have received no messages from you since may 23 and prior to that on may 19. Also only 1 from dce on May 30 regarding Senders visit. What goes? Could it be that slow? 1

PWO 5-JUN-75 11:13 32674

missing messages

(J32674) 5-JUN-75 11:13;;;; Title: Author(s): Pat Whiting O'Keefe/PWO; Distribution: /DVN([ACTION]) ; Sub-Collections: NIC; Clerk: PWO;

missing journal items

PWO 5-JUN-75 11:19 32675

1 I have received no journal items since May 30, and dyn has sent me
2 different ones earlier this week on separate days. What gives? 1

PWO 5-JUN-75 11:19 32675

missing journal items

(J32675) 5-JUN-75 11:19;;;; Title: Author(s): Pat Whiting O'Keefe/PWO; Distribution: /FEEDBACK([ACTION]) JDH([ACTION]) JCP([ACTION]) DVN([INFO-ONLY]) ; Sub-Collections: NIC FEEDBACK; Clerk: PWO;

MIKE 5-JUN-75 12:10 32676

J. Bhatt (bnr- 7F41) will be here in late june to talk SL/1 and its applications in medical comm'ns. systems

this guy is obviously looking for money as well as constructive criticism;

MIKE 5-JUN-75 12:10 32676

J. Bhatt (bnr- 7F41) will be here in late june to talk SL/1 and its applications in medical comm'ns. systems

1 He's looking for application of SL/1, a digital PABX. 1

2 His first attack is on hospital communications systems. He thinks that with the help of SL/1, a computer, and a lot of simple keyboard devices hooked into Logic-10 type sets, he can improve communicatons in small - medium size hospitals at little cost. 2

3 He's an engineer with a technology waiting for a place to happen, but some of it sounded interesting, and I told him he could expect an invitation to come here and show off his wares sometime later this month. I assumed that interested prties would be lhd, gce, ak, and mike 3

MIKE 5-JUN-75 12:10 32676

J. Bhatt (bnr- 7F41) will be here in late june to talk SL/1 and its applications in medical comm'ns. systems

(J32676) 5-JUN-75 12:10;;;; Title: Author(s): Michael T. Bedford/MIKE; Distribution: /MIKE([ACTION]) LHD([INFO-ONLY]) AK2([INFO-ONLY]) GCE([INFO-ONLY]) ; Sub-Collections: NIC;what happened ?>; is this wrong?>; Clerk: MIKE;

KLM 5-JUN-75 13:41 32677

SHORT TRAINING SESSIONS?

1 Would anyone be interested in some short sessions on topics you are interested in, discussing any problems you have encountered, or learning about new aspects of NLS? ARC has expressed interest in sharing new ideas,etc. with us--short sessions a few times a month. If you are at all interested please contact either Glenn or me (by phone or through send message). Thanks. Kathey 1

KLM 5-JUN-75 13:41 32677

SHORT TRAINING SESSIONS?

(J32677) 5-JUN-75 13:41;;;; Title: Author(s): Kathey L. Mabrey/KLM; Distribution: /SRIUU([ACTION]) ; Sub-Collections: NIC SRIUU; Clerk: KLM;

DLS 5-JUN-75 14:02 32678

Directory for Ruple

He should be in the ARPANET directory list I gave Jake....200 pages
iis good for a starter...Thanks, Stoney

DLS 5-JUN-75 14:02 32678

Directory for Ruple

1 Please create a directory for the following individual: 1

1a Samuel L. Ruple
Rome Air Development Center
(ISIS)
Griffiss Air Force Base
New York 13441 1a

1b Directory name--RUPLE 1b

1c Password--SLR 1c

1d Ident--SLR 1d

1e Member of the RADC group 1e

1f Phone-315-330-4875 1f

1g Mail address--RUPLE@OFFICE-1 1g

DLS 5-JUN-75 14:02 32678

Directory for Ruple

(J32678) 5-JUN-75 14:02;;;; Title: Author(s): Duane L. Stone/DLS;
Distribution: /JCN([ACTION]) FEED([ACTION]) RN2([INFO-ONLY])
EJK([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: DLS;

EJK 5-JUN-75 14:08 32679

Forward command in Sendmail

1 I am sitting here loking at my journal branch which shows an item sent to me (hjournal,32673). I have tried thre times to send it and once to send another. First time I bugged the link when I was asked for number. Second time I bugged the number that is on the first line of the citation. Third time I typed in the number. In each case I was told that there is no document with tat number. Am I doing something wrong? Itried to send znother with the same result. COMMENT??? 1

EJK 5-JUN-75 14:08 32679

Forward command in Sendmail

(J32679) 5-JUN-75 14:08;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /FEED([ACTION]) DLS([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

Forward command in Sendmail (2)

1 Re: previous mail, the first item I tried to send was dated 5 jun. The second was 4 Jun. I just tried one dated 3 Jun and everything worked fine. I guess they have to 'ripen'. I used exactly the same procedure except I sent it to only one addressee, Namely DLS. 1

Forward command in Sendmail (2)

(J32680) 5-JUN-75 14:18;;;; Title: Author(s): Edmund J. Kennedy/EJK; Distribution: /FEED([ACTION]) DLS([INFO-ONLY]) ; Sub-Collections: RADC; Clerk: EJK;

Draft 6 JUN 75

This is a draft of my dissertation. Missing pages are those of the OTP report - essentially Sections II through V. Output processor directives are included.

1

1

1a PAY TELEVISION AND FREE TELEVISION 1a

1b A policy assessment based upon a projection of future consumer demand for pay television 1b

1c Ra3y Panko 1c

1d Draft 6 JUN 75 7:56PM 1d

2

SYNOPSIS

2

2a Knowledge of consumer demand for pay television - or rather lack of this knowledge - has long dominated the regulation of pay television. When the Federal Communications Commission originally authorized pay television, it could not predict the outcome of open competition between pay television and conventional televisionFaced with the possibility of immediately destructive competition, the FCC imposed a set of strongly anticompetitive rules on the new medium. 2a

2b By 1973, however, data on consumer demand were beginning to emerge rapidly. This study analyzes currently-available data and an upper bound for projects consumer demand to 1985. Special emphasis is given to demand parameters affecting potential economic interactions between conventional televison and pay television. 2b

2c The analysis finds that potential economic interactions will not be large; they will be negligible to moderate, especially during the next five years but also throughout our projection period. While these projections must be tested experimentally, they imply that the basis for the FCC's current regulatory approach, namely a danger of

immediate and serious harm to conventional television - is not well-founded. 2c

2d The FCC and Congress should begin to reconsider the current regulatory policy as soon as possible, to prevent inertia from cementing intellectual and legal precedents. The FCC and Congress should consider pay television broadly, as a part of a total system for financing television. Current regulations were designed to protect consumers from paying for what they now see free. But consumers already pay $5 billion per year - $75 per household on the average - to finance conventional television's production and distribution. Although these payments are made indirectly, through taxes and premiums on advertised products, they are still large. 2d

2e Historically, other media have not relied upon advertising alone, and the results have not been inimical to the public interest. For example, a full system of financing, including advertising, subsidies and direct consumer payments, has brought extensive diversity and quality to the print medium. The Federal Government should determine whether the same would happen in the television medium under a competitive and perhaps nondisjoint financing system involving pay television, advertiser-supported television and public television. At the very least, the Federal Government should not automatically place advertising support in a position of primacy. 2e

2f It is impotant to continue the anlysis of data in the future.

Our current projections are not sufficiently precise to generate long-term regulations, only to probe general regulatory assumptions. Fortunately many data will be generated in the near future. If these data are collected and analyzed, the time horizon of projections can be lengthened greatly during the next three to five years. 2f

2g One action must be taken immediately by the FCC, however, if future regulatory improvement is to be ensured. The FCC must immediately create a program of experimental relaxations to the current anticompetitive regulations. These regulations now prohibit key market tests that are critical to the creation of an effective long-term regulatory policy toward pay television. In the past, the FCC has opposed experimental relaxations on grounds of practicality and value to the regulatory process. While it is true that there are difficulties attendant to such a program, these difficulties are not severe. And without experimental relaxations, only cosmetic changes to the FCC's current regulatory approach are likely to be possible before time sets the FCC's original ad hoc policy into a form that will severely resist fundamental change. 2g

3

FOREWORD

3

3a The economic analysis for this study was completed in late 1974. Since then, several events bearing on our analysis have occurred, and it seems fitting to comment upon them. One is a continuing inflation; the reader is cautioned to add about 10 percent to quoted prices when intepreting the results in terms of 1975 prices. 3a

3b Second, the Federal Communications Commission has recently revised the antisiphoning rules that are the focus of this study. These revisions were very minor, however, and should not have a significant bearing upon our analysis, conclusions or recomendations. 3b

3c Third, new consumer demand information has become available, as our analysis indicated they would. Overall, these data require no material reestimation of our original estimation and in fact serve to confirm our original analysis. Our analysis was intended to produce reasonable upper-bound estimates for consumer demand, and none of these new data suggest that our results are not reasonable upper bounds. 3c

3d Pay cable televison's performance has improved substantially since our base data were collected. However we overestimated demand when interpreting those original data. The net result is that our upper-bound estimation of current demand has become instead a very close estimate of consumer demand. In fact, our entire model for pay cable's impact on cable television today has been confirmed to a degree that must be attributed to good fortune. 3d

3e Looking toward the future, Home Box Office has recently announced the creation of a national satellite network for pay television; although this came somewhat more quickly than anticipated, our projected growth rate for pay cable's market size was sufficiently high that no reestimation is needed. 3e

3f In one area, however, we have erred to a substantial extent. Broadcast pay television has not yet entered the marketplace, and our estimate for its time of emergence may be a year or even two years early. Underestimating STV's emergence date, of course, does not harm the integrity of our analysis as an upper-bound projection 3f

3g 3g

3h This dissertation is based in large part upon a study conducted by the author while at Stanford Research Institute, under a contract to the Office of Telecommunications Policy, in the Executive Office of the President. The author was project leader of this

study. However this dissertation has different aims than the OTP study, and we wish to state these differences clearly. 3h

3i The OTP contract required SRI to project an upper bound on national consumer demand for pay television and also to project upper bounds on certain specific aspects of demand. The study was not directed specifically at the antisiphoning rules that govern pay television, and SRI was not to make policy interpretations or recommendations on the basis of the results. 3i

3j This dissertation, on the other hand, was intended to be an analysis of current pay television regulations, that is, the antisiphoning rules. While it includes the economic analysis performed at SRI as a large portion of its total substance, it interprets these results in a policy setting and makes specific recommendations for future regulatory actions. We wish to note that the views, conclusions and recommendations contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of Stanford Research Institute, of the Office of Telecommunications Policy, or of the U.S. Government. 3j

3k In summary, this dissertation embodies the economic analysis completed at Stanford Research Institute, but this is its only connection with the Institute or with the Federal Government. 3k

31 31

3m It is impossible to acknowledge and thank all of the people who have assisted me in this long study, but I would like to mention at least some of the people to whom I am deeply grateful. 3m

3n During early 1973, the author was project leader for a student group studying pay television at Stanford University. This project was part of a two-quarter course conducted by Professor William K. Linvill of the Department of Engineering Economic Systems. Professor Edwin B. Parker, the author's advisor in the Communication Department, was the team's advisor. Professor Bruce K. Lusignan, of Electrical Engineering, also provided valuable advice. The students in this course, in addition to the author, were Carol Warfield, Thomas Crowley, and John Haptas. During the winter and spring of 1973, this group surveyed the emerging pay television industry. 3n

3o In mid-1973, the Office of Telecommunications Policy issued a Request for Proposals to conduct a demand projection for pay television demand. The author wrote a proposal for SRI and became project leader when the effort was funded. The project supervisor at SRI was Dr. Robert F. Daly, Director of SRI's Telecommunications Sciences Center. Other SRI employees who contributed to the project were Gwen C. Edwards, Kenneth Penchos, and Steven P. Russell. The technnical contract monitor at OTP was Dr. Vincent Sardella. Dr. Sardella and James Alleman of the Department of Commerce provided many helpful suggestions for the study. 3o

3p Before the proposal was funded, however, the author and his dissertation committee had outlined a course for research that would continue whether or not the proposal were funded. In addition to the economic analysis required in the OTP study, the author was to place this analysis in a suitable policy setting and to make recommendations, as appropriate, for changes in future regulations. The dissertation committee, to which the author is especially grateful, consisted of Professor Parker, Professor Linvill, and Professor Lyle M. Nelson of the Communication Department. 3p

3q 3q

3r I hope that this study will be of value to te Federal Communications Commission and to Congress, in whose hands rests the future of the television industry. Our study indicates that the joint regulation of pay, advertiser-supported and public television will be a difficult task to execute in the best public interest, but that this difficulty will be a small price to pay for the potential public benefits of insightful and decisive policy formulation. 3r

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7

I INTRODUCTION

7

7a A. Overview 7a

7a1 Pay television regulation has been dominated by a single regulatory issue: the impact that pay television might have on conventional television service. In 1968 the Federal Communications Commission created regulations designed to allow pay television to exist but at the same time designed to protect advertiser-supported and public television, which are usually referred to together as free television. 7a1

7a2 When pay television regulations were first formulated in 1967, there were virtually no data on consumer demand for pay television, and the FCC could not rule out the possibility that pay television might cripple or even kill free television in the absense of anticompetitive regulations. As a result, the Commission sharply restricted pay television, through a set of regulations popularly called the antisiphoning rules because they were designed to prevent pay television from "siphoning away" free television's programs. The FCC has twice reconsidered these rules. Yet in both instances the

Commission was plagued by the fundamental problem that first necessitated the rules: in all the oral and written testamony presented to the Commission, there were only a few scraps of demand information. 7a2

7a3 Until consumer demand is better known, it is unlikely that the Commission can take any strong actions to reconsider its original regulatory approach, even though that approach was created from necessity rather than long-range planning. Of course demand cannot be projected precisely into the very distant future with today's data, but such projections are not needed for regulatory improvement. At present, it would seem to be sufficient, given existing practical constraints upon what regulators can accomplish today, if we could characterize demand as falling into one of three levels. 7a3

7a4 In the first level, pay television demand would be so high as to swamp free television. In the second, pay television demand would be high enough, in an upper-bound analysis, to interact significantly, although moderately, with free television. In the third, pay television demand, in an upper-bound analysis, would be so low as to leave conventional television virtually untouched. 7a4

7a5 If consumer demand will be high enough to severely damage conventional television in the absense of regulation, then the present regulatory course, which essentially grants absolute protection from competition to conventional television, is almost

certain to be retained. But if economic interactions between pay television and conventional television will be negligible to moderate, then the FCC's current regulatory approach will no longer be firmly grounded in obvious benefits to the public. The FCC would not be justified in continuing its stringent anticompetitive policy without serious consideration of other courses of action. 7a5

7a6 While few data on consumer demand for pay television were available in 1967, the picture in 1973 was changing rapidly. Several pay television operations were underway and more were being built. Their collective experience would rapidly become sufficient to form a good bracket around demand for today's program mix, which is about 120 movies per year in most operations, although some systems offer a significant number of sports events. In addition, data were available from situations analogous to pay television, and these data appeared to allow an analysis of revenue growth as the program mix broadens in the future to encompass sports, other entertainment and "nonentertainment" programs. Overall, at the beginning of 1973, prospects for projecting reasonable upper bounds on consumer demand for pay television appeared to be good. 7a6

7a7 Accordingly, in the spring of 1973, the author began an analysis of consumer demand for pay television. In June of 1973, the Office of Telecommunications Policy issued a request for proposal for a similar study. The author wrote a proposal for Stanford Research Institute and was made project leader when the contract was awarded.

Introduction

In May 1975 the final report was submitted to the OTp. This dissertation is very similar to the OTP report, although it includes substantial policy discussion and interpretation, neither of which were in the OTP report. We wish to note that the views, conclusions and recommendations contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of Stanford Research Institute, the Office of Telecommunications Policy or the U.S. Government. 7a7

7a8 There are two parts to the demand analysis that was conducted. The first projected reasonable upper bounds for national pay television subscribership and revenues to the year 1985. The second projected reasonable upper bounds on specific demand parameters relevant to the analysis of potential economic interactions between free television and pay television. BY reasonable upper bounds we mean estimates that include assumptions and interpretations of data that tend to overstate demand, yet which are not highly urealistic. Upper bounds were calculated because most regulators are interested in a "worst case" analysis of potential economic interactions between pay and free television in the absense of anticompetitive rules.. 7a8

7a9 Table III-16 presents our upper-bound estimates for national pay television subscribership and revenues. At the beginning of 1980, we project up to 7 million subscribers and $583 million in

national revenues. By the end of 1985, we project up to 16.2 million subscribers and annual revenues of $1.9 billion. Our sensitivity analysis indicates that our long-term upper boundare less precise than our 1980 projections. 7a9

7a10 Free television now costs consumers $5 billion per year(1), while our long-term projections would place pay television at about 40 percent of that figure. This might indicate that potential economic interactions between the two media are rather likely, but size alone is misleading. For example, the movie theater industry has revenues of $1.4 billion dollars (see Table III-9), while we project movie revenues on pay television at only $0.4 billion. Yet historically it was the theater industry that suffered competition from television, and in fact the theater industry pays for the bulk of movie production expenses, generating for free television its most popular programming. So size alone does not measure potential economic interactions; it is necessary to model interactions, identify specific demand parameters in the models and quantify these. 7a10

7a11 We did model potential economic interactions in four areas: audience loss and competition for movies, sports and series. Although audience loss is not directly addressed by the antisiphoning rules, it is an important policy concern. Competition for movies, sports and series was specifically addressed in the antisiphoning rules. After developing the models,* we identified key demand parameters and quantified them with the best data available or at

least noted the ranges over which there would not be negligible interactions between pay and free television. We also quantified supply parameters as required by the models. 7a11

7a11a * In general, our modeling involved a "siphoning" paradigm, that is, direct bidding between pay television and advertiser-supported television for individual programs on the basis of rentals each medium could pay. We recognize that a full analysis would compare the marginal revenues and costs that a program would bring to each medium and would simultaneously examine bidding for all types of programs. To some extent we did consider incremental bidding strengths. But full incremental modeling would have been impossible with today's data. Moreover, such a detailed model is not necessary for a preliminary estimation of relevant demand parameters. 7a11a

7a12 From our analysis of potential audience loss, we concluded that advertiser-supportd television's prime-time audience loss, even under assumptions that should strongly tend to overstate real losses, would be less than 5.8 percent at the end of 1979, and 11.9 percent at the end of 1985. Population growth alone should approximately offset this level of loss. 7a12

7a13 Why is potential audience loss so small, in view of pay television's large projected revenue growth? The answer is found in our analysis of consumers's demand for additional programs like those now shown on network television in prime time. Our analysis,

presented in Sections IV-E and the Appendix, indicates that consumer demand for such programs is very small compared with demand for "box office" programs, that is, programs more expensive to produce than those ordinarily shown on the networks (for example new movies) or appealing to narrow audiences. This same analysis caused us to place a low upper-bound on pay television's ability to compete with free television for conventional-type television programming. However current data are not excellent, and a few market tests of conventional-type television programs would do much to test the validity of our analysis. 7a13

7a14 For movies, potential economic interactions are critically dependent upon the revenues generated during second, third, and even fourth runs on pay television, not upon their first-run rentals. Our analysis indicated that if revenues from pay television decline with subsequent reissues at about the same rate they do in theatrical exhibition (which has roughly analogous economic characteristics), there will be little danger of material program delays. However under current FCC rules, reruns are sharply curtailed, so we have no direct data on pay television reissue demand. 7a14

7a15 For sports, the picture is very complex and differs from sport to sport. In general, our worse-case analyses indicate comparable bidding strengths for the two media in some instances. But our data are very indirect and scatter is high, so worst-case analyses may be rather misleading. Until pay television offers a

substantial number of sports events, especially in the case of football, the picture will remain cloudy. Comparbility of biding strengths means that full marginal economic analysis of revenues and costs for the two media should be considered, and we did examine evidence concerning the likely substitutability of different sports events on pay television. 7a15

7a16 During the next three to five years, many more data will become available, as pay cable probes new markets, as STV operations begin and as sports and other programs are offered on pay television. These data should do much to improve our estimations. Section V discusses the future availability of data. 7a16

7a17 Yet even after three or five years, a substantial irreducible core of uncertainty will remain, simply because of the FCC's antisiphoning rules. These rules prohibit the paycasting of programs in uncertain areas and as a result tend to systematically prevent precisely the kinds of market tests needed to assess whether the antisiphoning rules are necessary or desirable. In movies, the situation is particularly bad. Unless some pay operators are permitted to show second, third and even fourth runs of movies, it seems doubtful that much improvement of our current estimates of potential economic interactions under open competition will be possible. 7a17

7a18 In sports, the nature of consumer demand is currently known

only poorly, so it is difficult to assess the impact of the current rules on data collections. However the greatest uncertainty exists in the critical category of professional football, and the current rules probably inhibit the market testing of professional football games to a considerable extent: they certainly do in markets where many games are now shown. 7a18

7a19 The new series rule, created since this study was completed, effectively prohibits the paycasting only of series that have been shown on free television. Yet as our analysis indicates, demand for conventional-type television programming appears to be low, and pay operators are not likely to produce any series programs like those now shown on television for many years. The only way to probe series demand in the near future is to telecast off-network reruns. While such programs are likely to have substantially lower demand than new series, they should be sufficiently close surrogates to test the validity of our basic conclusions about the demand for conventional-type television programming. If such testing invalidates our basic conclusions, our analysis will have to be substantially revised. 7a19

7a20 Although allowing variances to the current rules, in order to generate needed market data, will produce different benefits in the three cases of movies, sports and series, there is a pattern to the benefits that would be gained. These tests would be most conclusive where potential interactions would be most immediate under

any relaxation of the antisiphoning rules, i.e. for movies, and least conclusive where potential interactions are unlikely to occur for many years, i.e., for series. For longer-term potential dangers, there is less need for accuracy, but at the same time, uncertainties are greater and tests can greatly reduce current uncertainties. 7a20

7a21 In light of the potential benefits that could be gained from market tests now prohibited by the antisiphoning rules, and in light of the potential paralyzing effects if these market tests are not made, we are led to recommend that the Federal Communication Commission immediately embark upon a program to selectively relax the antisiphoning rules. In Section VI we discuss how the FCC might implement a program of market testing without damaging its long-term options. 7a21

7a22 This study has concentrated on data collection and analysis, because this is the most pressing need facing the FCC in its attempts to improve pay television regulation. Yet it is obvious that at some point data analysis must lead to changes in regulatory philosophy. In fact our conclusions indicate that the FCC will have to substantially alter its basic philosophy in the near future. Our findings indicate that interactions between pay and free television will be negligible to moderate; yet current rules were created to cope with a pay industry having a high potential for destruction. Of course our findings must be tested and improved, yet it is not premature to consider new regulatory directions. 7a22

7a23 To discuss how the FCC might approach pay television in the future is a large project, far beyond the scope of this study. However we would like to present some background considerations that would have to be built into future regulatory approaches if open competition between pay and free television would be benign or at least moderate. Before doing this, however, it seems best to summarize the organization of this dissertation. 7a23

7b B. Organization of the Dissertation 7b

7b1 Our projections are presented in Sections II through IV. Section II presents general background information about pay television and introduces the data used in the analysis. Section III discusses the projection of national subscribership and revenue growth. Section IV examines specific aspects of demand relevant to audience and program siphoning. Because this analysis is lengthy and complex, we present a summary of our approach, conclusions and the outlook for future data collection in Section V. Sections II through V are taken virtually intact (there are no changes in substance at all) from the SRI final report to the Office of Telecommunications Policy. 7b1

7b2 Appendix A presents details of our analysis of demand for additional conventional-type television programming. This analysis was conducted by Mr. Stephen Russell. Appendix B is the executive summary of the final report of the Office of Telecommunications

Policy study upon which the economic analysis was based. The reader wishing an overview of the general economic approach or a detailed summary of conclusions should consult Appendix B. 7b2

7b3 Section VI presents our recommendations. This section briefly discusses the probable need for a major reassessment of the FCC's basic regulatory approach to pay television (a topic discussed in the following subsection), then considers the need to organize the data that will be generated in the near future. The Section also presents an immediate recommendation: that the FCC immediately embark upon a program of experimental relaxations to its current antisiphoning rules. Considerations concerning a program of experimental relaxations are considered. 7b3

7c C. Considerations for Future Regulatory Policy 7c

7c1 1. The Primacy of Advertising Support 7c1

7c1a The FCC and Congress have given "free" television a position of primacy, in which no competition from pay television is to be allowed. This is understandable, because viewers really appear to be getting something for free. Although they must watch at least eight minutes of commercials each prime time and more during other hours, people seem to consider this a modest price to pay. 7c1a

7c1b But having to watch commercials is not the only price people pay. Viewers must eventually pay the costs of television

production and distribution. They do this by paying premiums on advertised products. These premiums, if they offset costs, must run about $5 billion each year<1> -- $75 for each American household. So the "free" nature of television, in the end, is an illusion. 7c1b

7c1c Compared to this $75 annual cost of free television, which is borne by all Americans, pay television fees now run about $100 per year and are borne only by actual subscribers. So if the real costs of free television to the consumer are taken into account, the position of primacy given to advertiser-supported television relative to pay television is not simple to defend. Given this rough equality of demand between the two media, even if pay television were to substantially cut into free television, the effects of this competition might be highly beneficial to the public. 7c1c

7c1d Advertiser-support does more than burden Americans with a $5 billion annual cost. It also constrains what television can show. Advertisers are willing to pay only about 3.2 cents per household viewing hour<1>. But television's costs are high, and this low level of per-household support can only bring mass audience, comparatively low-priced programming. 7c1d

7c1e As a concrete example, CBS telecast Shakespeare's Much Ado About Nothing in 1972. Nearly one American household watched this program<2>, a tremendous triumph for the arts. But for CBS Ado was a disaster. It cost $948,400<3> to produce -- $472,400 per hour

for the two-hour show. But two standard one-hour series episodes could have captured 15 percent of the nation's household and cost only $400,000 to produce. As a result of the Ado "disaster," the network revised its plans to offer other quality programs<4>. 7c1e

7c1f In the evening hours, advertiser-supported television can only show programs costing about $200,000 per hour and attracting about 18 percent of the nation's houesholds when they are telecast. Television does offer some better programs, but these exceptions only prove the rule. Blockbuster movies can only be shown during sweep weeks, when the networks can use their high ratings to manipulate the ratings system. Such excellent dramatic programs as the Autobiography of Miss Jane Pittman can attract good ratings but, like Pittman<5>, they cost about $500,000 per hour to produce, too much to be a television staple. Even educational programs, such as The Ascent of Man ($350,000<6> per hour) and National Geographic ($335,000<7> per hour) are more expensive than run-of-the-mill series, and they attract smaller audiences. 7c1f

7c1g This is not to say that television cannot offer excellent programs. There is nothing in the nature of the video medium that holds cost per viewer hour to 3.2 cents. Movies are a video product, and they cost about $2 million. The Ascent of Man was also a video product, and its cost, as noted above, was much higher than the $200,000 series average. 7c1g

7c1h Television's problem is the 3.2 cent per viewer hour ceiling that advertising support places on television viewing. Pay television experience has proven that consumers value some of their time, although not a great deal of it, at more than 3.2 cents per hour. For certain excellent programs, a substantial number of people are willing to pay over $1.00 per hour for their family's entertainment or education. 7c1h

7c1i In summary, free television is not free. It costs the typical family about $75 years, requires viewers to watch eight or more minutes of commercials each hour, and forces television to offer only mass-audience programs of limited quality. This may still be a fair price to pay, but it is not so low that advertiser-supported television should without question be given a place of absolute primacy by the FCC and Congress. With pay television, even in the long term, costing only about half as much per capita, the FCC should examine instead whether pay television should not only allowed to compete with free television but even encouraged to do so. 7c1i

7c2 2. The Historical Development of Advertiser Support 7c2

7c2a How did advertiser support come to dominate television? The answer is largely historical and begins with the earliest days of radio, in the 1920's. After World War I, the government created a virtual monopoly in radio production and distribution<8>. It created the Radio Corporation of America as a

joint subsidiary of AT&I, General Electric and Westinghouse. This monopoly was to create a commercial radio industry in the United States. 7c2a

7c2b Among the early pioneers was David Sarnoff of RCA. Sarnoff developed a plan in which the radio manufactureres would pay for radio production and distribution out of the profits from receiver sales<9> For a time, it seemed that fees paid on receivers would be the dominant mode of financing for radio. But AT&T, which did not manufacture receivers, would not have shared expected profits; in 1923 (after leaving RCA), AT&T began to sell commercials on its New York station<8>. 7c2b

7c2c AT&T's competitors and the government strongly opposed the commercialization of radio<8>, but the government had no effective power over the industry then, and AT&T maintained its commercials. Other station owners quickly followed suit and radio was commercialized before any government action could be taken. 7c2c

7c2d In retrospect, receiver profits alone would probably have been insufficient to finance radio. Performers began to demand payment for air play, not being content with the free publicity it gave them, and costs in general rose very rapidly. 7c2d

7c2e But if commercial support was opposed, why was direct consumer payment ignored? The answer is simple. In the 1920's, when basic transmission hardware was barely available, the technology to

charge for programs was completely unavailable. Direct consumer payment was probably never considered. 7c2e

7c2f When television emerged after World War II, the situation was very different. In the late 1940's, pay television hardware was developed, and three companies undertook field tests in 1950 and 1951. In 1952, the Zenith Radio Corporation formally petitioned the FCC to make pay television a national broadcast service. But by the 1950's, the FCC had forgotten the arguments against advertiser support in radio and had come to except this method of financing as natural and self-evident. Not until 1955 did the Commission even act on the Zenith request, and by then advertiser-supported television was well-entrenched. Although Zenith and other potential pay suppliers fought continuously for pay television, it was not until 1970 (see Section II) that the legal barriers to pay television were lifted. 7c2f

7c2g In summary, advertiser-support has come to dominate television service only because of historical inertia. It was strongly opposed at the time of its creation but eventually became accepted as natural by the FCC. 7c2g

7c3 3. A Financing Viewpoint 7c3

7c3a In the preceding subsections, we have noted that advertiser-supported television costs the average household about $75 per year and that this form of financial support for television was

largely a historical accident, opposed at the time of its creation in the early days of radio and transferred to television primarily out of inertia. But these are largely negative comments. They do not address how the FCC may consider pay television in its deliberations. 7c3a

7c3b To offer a rough but useful useful paradigm, we turn to the print medium. In print, there has always been a three-fold system of financing: direct consumer payments, advertiser support, and subsidy by foundations or the government. In print, this versatile system of financing has brought considerable diversity by combining consumer and advertiser demand. In essence, a magazine is a tool for bringing together an audience, production talent and advertisers who share common interests. In magazines, as in newspapers, advertising and direct payments contribute roughly equal shares of total revenues. 7c3b

7c3c Print has two lessens to offer. The first is that advertising support and direct payments are not antithetical. For some products, both can pay roughly equal shares of costs without causing problems. For other products, such as books, costs are so high as to make advertising more of a nuisance than a help, so direct payment dominates. Consumer demand, in the end, dictates how the two contributors can interact in the public interest. 7c3c

7c3d The second lesson is more fundamental. It is that advertising support, direct payments and subsidy are really only

different ways to achieve the same end -- financing the production and distribtuion of products. These three financial mechanisms form, in essence, a full system of financing for print, achieving together a greater diversity and quality of product than any one form could achieve alone. 7c3d

7c3e For television, these three modes of financing may also be able to work together to create a more diverse and higher quality product than we now enjoy. Television has, historically, not been very creative compared to its traditional pay-video counterpart, theatical movies. Pay television may also stimultate diversity and act jointly with advertiser-supported television (just as theaters do now) to create a better product than either medium alone could produce. 7c3e

7c3f But exactly what would the outcome of full open competition look like? With current data we cannot tell. But by asking the question "what would a full system of financing for television bring?" instead of "how can we best provide absolute protection to advertiser-supported television," the FCC and other interested parties can begin what is likely to be a long task: the creation of a full system of financing for television that best serves the public interest. 7c3f

8

VI RECOMMENDATIONS

8

8a A. Overview 8a

8a1 Our findings have both longer-term and immediate action implications for the Federal Communications Commission. For the long term, our results indicate that the FCC will probably have to alter radically its basic regulatory approach to pay television. For the intermediate term, the next five years or so, the FCC must act to gather the information needed for this change. Immediately, however, the FCC must counteract one highly undesirable feature of the current antisiphoning rules that might delay or even seriously compromise long-term regulatory improvment; this will involve a major program of experimental relaxations of the current antisiphoning rules. 8a1

8a2 In this final section of the report, we discuss why our findings lead us to these policy conclusions. We also discuss in some depth the immediate actions that we feel the FCC must take if continuing regulatory improvement in the long term is to be ensured. Although we would prefer to present an extensive discussion of

longer-term actions the FCC should take, this would be far beyond the scope of this study. 8a2

8b B. Results Having Major Action Implications 8b

8b1 Section V presented conclusions in considerable detail. It is useful, however, to explicitly note conclusions that hold major policy implications. 8b1

8b2 1. Viewing Time 8b2

8b2a Pay television viewing time, according to our analysis, is likely to be restricted by the high price that will be charged on pay television (Pay television now costs over $1.00 per viewer hour). In addition, not all households will take pay television. Our analysis indicates that only about a fifth of all households will be pay subscribers in the long term. Even assuming that prices fall to a quarter of their current levels, and that every hour of pay television viewing comes at the expense of one hour of free television viewing in prime time, free television's prime time audience would decline by only 11.9 percent in 1985. With more reasonable cross-impact assumptions, the effect would be much smaller. This conclusions is obviously dependent upon the analysis (noted below) that consumers have relatively little demand for additional conventional-type television programming. 8b2a

8b3 2. Movies 8b3

8b3a In theatrical exhibition, movies collect most of their ultimate rentals on the first run. The first reissue generates less than 30 percent of the first run rentals, and subsequent reissues generate even less. As a result, network television can usually outbid theaters for movies after one or two theatrical reissues. Our analysis shows that if rentals decline with pay television reissue at something near the rate they do with theatrical reissue, then the normal network premiere dates of movies will be only slightly affected. It does seem likely that pay television reissue declines will approximate those of theatrical reissues. In both exhibition modes, the audience is offered the program many times on each run, so the audience tends to be saturated quickly. 8b3a

8b3b Unfortunately, current rules (including those adopted since the data analysis was completed) effectively forbid second and higher reissues on pay television. As a result, unless the FCC allows experimenation forbidden under current rules, there will be no adequate data with which to verify or invalidate our analysis. 8b3b

8b4 3. Sports 8b4

8b4a For sports, we had mostly indirect data on consumer demand. We did, however, estimate the relative attractiveness of individual events in different sports compared to the attractiveness of average movies on pay television. For sports that have been shown in substantial numbers on pay television, mainly basketball and

hockey, our predictions are in excellent agreement with the results of pay television exhibition. Unfortunately, for the two most important American sports, baseball and football, there is strong disagreement in our underlying data, and there have been no significant field tests on pay television. For football, projections from our two best data sources differed by more than a factor of two. All of our conclusions concerning sports are therefore imprecise. 8b4a

8b4b To probe the sensitivity of our analysis of this imprecision, we compared current free television renatals and likely pay television rentals for baseball and football, using projections based upon different data sources. We performed this analysis for several types of national and regional networks. In general, our highest projections would imply rough equality of rentals between pay and free television in three to five years, while our lower projections would indicate substantially lower rentals from pay television even in the long term. Thus it seems imperative to collect a significant amount of actual market test data from pay television and to redo our analysis with the aid of these data. 8b4b

8b4c A major question in sports is whether different sports events will be treated as different program categoies by consumers. If they are not, then the very large number of sports events available in a typical region would probably saturate demand to the extent that pay operators would only be willing to show some of them. Our analysis of two data sources indicated that consumers do, in

fact, view different types major sports events as being reasonably close substitutes. This finding indicates that analysis of bidding between pay and free television in the case of sports is likely to be very complex. 8b4c

8b5 4. Additional Conventional-Type Television Programming 8b5

8b5a Our analysis found rather low demand among consumers for programs like those already offered on the networks. Essentially, our analysis indicated that the networks have saturated the public's desire for such programs, so that pay television, like theatrical exhibitors, will be pressed to offer more expensive or select audience programs. 8b5a

8b5b This analysis is, in many ways, the pivotal portion of our study. If demand for additional conventional-type television programs is not small but rather comparable to, say, demand for new movies on pay television, then many aspects of our analysis would have to be redone. It is essential, therefore, to test this part of our analysis as soon as possible. 8b5b

8b5c Practically, there is only one way to do this: by offering a large enough number of representtative programs on pay television. The data source used in this analysis, consumer purchases of additional network service by means of cable television subscription, seems to be as accurate an analogous data source as possible. 8b5c

8b5d Unfortunately, no program producers seem willing to network-like series for pay television. While this is understandable, in light of our analysis, it means that it will probably take several years to check this crucial portion of our analysis if testing has to be done with made-for-pay-television product. 8b5d

8b5e One form of testing, however, does seem possible in the near future; this is the exhibition of off-network reruns, in substantial numbers, on pay television. Reruns will almost certainly have lower demand than new series, but paycasting reruns can at least determine whether our analysis is grossly in error. The exhibition of reruns on pay television will require a relaxation of current antisiphoning rules. 8b5e

8c C. Action Implications for the Long-Term 8c

8c1 As noted in Section I, the Federal Communications Commission's approach to pay television regulation is predicated on a single principle: absolute protection for advertiser-supported television. Historically, this principle was adopted for pragmatic reasons, not theoretical ones. The FCC created the stringently anticompetitive antisiphoning rules primarily because it could not tell whether pay television would destroy free television under free competition or less stringent rules. Demand data were virtually

nonexistent, and no other course of regulatory action seemed desirable. 8c1

8c2 There are two reasons why absolute protection might vailidy be maintained indefinitely as the FCC's guiding principle. The first is that free television might be considered a uniquely valuable service. Certainly, consumers do value free television highly. But this reasonning is superficial. As noted in Section I, the average American family is paying about $75 per year<1> for free television. Although these charges are indirect, they are large and cannot be lightly neglected. Also, the public may be willing to pay more than the 3.2 cents<1> per viewing hour that sponsors can profitably pay, in order to spend part of their viewing time watching programs of greater interest to them than standard network and independent television fare. 8c2

8c3 A second reason to preserve the current regulatory approach would be if pay television really would cause severe damage to free television, or even modest harm not offset by greater gains. In other words, if the FCC's concerns when it created the antisiphoning rules prove well-founded, then something akin to absolute protection would seem desirable. 8c3

8c4 But if consumer demand for pay television is only moderate, so that even under open competition advertiser-supported etlevision would be harmed only modestly and there would be simultaneous gains

to the public under open competion, then the FCC would probably be forced to take a broad view of television, seeing it as a system of service financed by a full complement of mechanisms, including direct consumer payments, advertising, and public grants. 8c4

8c5 This salutory-competition outcome would certainly not be new in regulatory history. For example, when the Interstate Commerce Commission first regulated trucking, it viewed highway transport merely as a competitor to a uniquely valuable rail system. Where there was a rail line between two points, trucking was routinely forbidden, even if rail service were poor<22>. In time, of course, a more balanced view was forced upon the ICC. First, it became clear that trucking also had unique and complementary benefits; while rail was slow but inexpensive, trucking was fast but expensive. Second, it became increasingly obvious that the public would not be harmed if considerable competition were allowed, because benefits from an excellent trucking system were being understood by the Commissioners. 8c5

8c6 Unfortunately, these realizations came slowly, and the ICC's regulatory approach was trapped in numerous cul de sacs that prevented the full evolution of a full system of public and commercial transportation. While rough equlity between the two modes was achieved, numerous legal and intellectual precedents had been set and the ICC had to constantly adjudicate claims on grounds only loosely connected to economics and the public interest. 8c6

8c7 It is impossible to say, with today's rough knowledge, what a full system of television financing would bring. We can, however, sketch a few generalities that give the possible flavor of the future. 8c7

8c8 It may well be, if our analysis is correct, that harmful competition would be negligible under open competition, i.e., that siphoning is a nonissue. Certainly the movie theater industry, which we noted in the Introduction is very large, has helped rather than harmed free television in the total absense of anticompetitive regulations. Our analysisis indicates that the same basic mechanism that caused helpful competition in the case of theatrical exhibition, namely the public's demand for programs more expensive to produce than those shown of free television, is present in pay television. However before more confident projections can be made, better data are needed. 8c8

8c9 Note that helpful competition does not imply negligible interactions. The movie theater industry and the television industry are both buyers for the same product. Instead, helpful competition implies that the two media have synergies. In the case of movies and free television, both media finance the production of more expensive programs than either alone could fund. Yet their audiences are sufficiently disjoint that prior exhibition in theaters does not destroy a movies's value on free television. 8c9

8c10 In essence, future regulation will have to focus broadly on the system that finances video production and distribution. Today there are essentially three stages in the flow of products: live attendance, exhibition on a primarly network, and subsequent exhibition on independent television stations. Pay television will probably change the flow of programs through these markets in three ways: by increasing the volume (and perhaps the quality) of programs, by creating a new set of made-for-pay-television programs, and by changing the timing of flows. Needeless to say, if pay television demand is negligible, its impacts will be slight. At the same time, if pay television demand is substantial (generally more substantial than our study indicates), the flows will be changed substantially, just as they did when free television changed the flow pattern in the 1950's. However the greater the change in the flow structure, and so the greater the impact on advertiser-supoorted television, the greater will be pay television's ability to generate the types of programs that free television can offer later, and the greater will be the intrinsic public value of pay television. 8c10

8c11 How do the results of our study fit into this overall picture? Basically, our results indicate that pay television demand will not be not large enough to cause severe harm to free television, although present data are not sufficiently precise to allow us to project whether potential interactions will be negligible or modest. While this is insufficient to decide among new alternatives, it is

sufficient to show that the principle of absolute protection for free television, upon which the current rules were predicated, is unsupported. It is also sufficient to indicate that the FCC's past policy of making relatively cosmetic and "fine tuning" changes to its current rules is probably inappropriate. Unless our analysis is fundamentally incorrect, the FCC will eventually have to deal with a situation of at least rough equality between pay television and free television. In order to avoid the frustrations and problems that faced the ICC in its regulation of highway transport, the FCC should take immediate actions to prepare for fundamental changes in its regulatory approach. 8c11

8c12 In this study, we cannot begin to discuss alternative regulatory patterns for pay television. This is a large subject area and, more immediately, the data to even formulate alternatives well is not yet available. Instead we will discuss some general things the FCC should do during the next five years and some immediate actions that are needed. 8c12

8c13 The FCC will be faced with difficult tasks in the future that may take it beyond its traditional posture as a disposer of suggestions rather than as a proposer of alternatives. As a practical matter, the FCC will probably have to rely upon outside agencies to make proposals, yet, as we discuss below, the FCC must begin to develop the types of expertise that will allow it to decide among future alternatives that will be presented to it, and there are

certain immediate actions the FCC must take to ensure that sound long-term regulation for pay televisio will be created. 8c13

8d D. Action Implications for the Next Five Years 8d

8d1 For the FCC to eventually revise its approach to pay television, certain things must be done during the next five years. First, alternative regulatory patterns must be explicated. It is likely that theoretical formulation will come not from the FCC but from agencies freer to initiate major policy changes, for example other governmental agencies, foundations or industry lobbies. It seems essential that the FCC have suitable alternatives to select among when the quantitative data sufficient for reassemssment becomes available. 8d1

8d2 Second, either the FCC or another agency must assemble the data that will become available during the next five years. As noted in Section V, the pay television industry will generate large amounts of data during the next three to five years. But this data must be collected if it is to be useful. 8d2

8d3 To make sense of future data, however, some model for pay television's growth and for economic interactions between pay television and free television will be needed. In this study, we have modeled these processes to the first approximation only, and future research must include the more sophisticated modeling that will be possible as more detailed information becomes available. 8d3

8d4 Although future models will be more sophisticated than our own, they will probably follow the basic steps we took. To quantify national subscribership and revenue growth, five steps will probably be required. First, a model for community demand when some base programming package is available must be generate and quantified. Second, the response of individual households to expansions of the program mix must be modeled. Third, subscribership and revenue growth within a community as the program mix broadens must be modeled. Fourth, the expansion of STV's and pay cable's availability to consumers must be modeled. Fifth, these models must be quantified. 8d4

8d5 To quantify economic ineractions between pay television and free television, however, much more sophisticated modeling seems needed; we a program modeled "siphoning," in which pay television would get programs if it could provide higher rentals for it than free television. This is sufficient if rentals for the two media are very different. But if revenues are within an order of magnitude or so, then marginal analysis will be needed. Models will have to take into account that both pay television and free television have many programs available to them, so the marginal revenues and costs of individual programs can only be understood if a broad range of information is available. Furthermore, it is not enough to model bidding alone; regulators are concerned with the effects of competition on the public, so if some programs are lost or gained,

the impact upon the public will depend upon the programs presented in their place. It is also necessary, in order to assess the value of competition, to weigh benefits and losses to the public from both media under open competition. Overall, however, the closeness of economic interactions will dictate what level of analysis is needed. 8d5

8d6 Although more sophisticated modeling will probably be needed eventually, our model should be sufficient to organize general data collection in the near future. As more data become available, several less precise parameters of our model can be remeasured and new projections made. At the very least, new data sould be able do subject our model to fairly critical testing. 8d6

8d7 Some parameters of our model can already be measured. For example, when we performed our analysis, only a handful of pay cable systems were built on low-penetration hos cable systems. On the basis of available evidence, however, we developed a model to project pay cable demand in any community. For a per-channel pay cable system charging $8.00 per month and offering 10 new movies each month, for example, we estimated that 23 percent of all initial cable subscribers and 7 percent of all noncable households would take pay television. 8d7

8d8 Since our analysis was completed, several pay cable operations on low-penetration host cable systems have since been in service long enough to provide useful data. Agreement between their

results and our model is excellent. The only public example now available illustrates this agreement; this is the pay cable operation on the Theta Cable system in Los Angeles, California. 8d8

8d9 Before pay cable was offered on this cable system, its community penetration was 18 percent<23>. According to our model, the introduction of pay cable should increase cable penetration to something less than 24 percent*; Theta Cable's penetration actually jumped to 25 percent<23>. Our model also projected that 42 percent of these final cable subscribers should be pay cable subscribers*; this is exactly the percentage achieved by Theta Cable<24>. 8d9

8d9a .....

*Actually, because Theta Cable charges only $6.95 per month<23> for the service, rather than the $8 in 1974 prices (roughly $9 in 1975 prices) that we used in our calculations, our projections for penetrations might not be upper bounds. Our projections for revenues (price times penetration), however, should still be upper bounds.

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8d9a

8d10 While this agreement between our model and actual demand for today's program mix is satisfying, our projection of demand growth into the future is less certain, and our projections of demand for individual movies, events, additional conventional-type television programming, etc., are also imprecise. Hopefully, if our

projections really are upper bounds*, future data will reduce our estimates. However, because we attempted to estimate reasonable uper bounds, some of our parmeters may have to be reestimated upward. 8d10

8d10a .....

*Note that beyond 1980 uncertainties become large enough to make reasonable upper-bound estimation less precise.

.....

8d10a

8d11 In the end, whether our model or some other model is used to organize the large flux of data that will be generated, it should soon be possible in three to five years to lengthen greatly the time horizon of upper-bound projections. It seems almost certain that the FCC will soon have sufficient data to make long-term regulatory changes, provided it acts decisively to gain access to these data, to organize these data, and to generate optional policies among which to decide. 8d11

8e E. Immediate Action Implications 8e

8e1 1. Specific Information Needs 8e1

8e1a We have remarked that without experimental relaxations it will be very difficult, probably impossible to collect certain data. As a result, there will always be a residue of needed but uncollectable data in areas that must be understood well if potential

interactions between pay television and advertiser-supported television are to be estimated precisely enough for regulatory change. We now discuss specific areas of concern. 8e1a

8e1b For movies, the question is how rapidly rentals will decline with subsequent reissues on pay television. If theatrical experience is a guide, declines will vary from movie type to movie type and from movie to movie in general. Consequently it is essential to gather data from a large number of pay television reissues -- not only for reissues in the first two or three years after the start of general theatrical release, but for reissues far enough in the future that interactions with network showings would be possible. Unless distant reissue patterns are known precisely, there may be large uncertainties in estimated potential interactions, since these interactions will depend on the incremental rentals from a reissue which brings in a small fraction of first-issue rentals. 8e1b

8e1c To ensure the generation of sufficient movie reissue data, it seems best to create a full relaxation of the movie rule for a period of at least three years. We recommend that a three-year moratorium on the movie rule be declared on certain pay operations, and that this be extended three more years if results from the first three years make this appropriate. 8e1c

8e1d For additional conventional-type television programming, it is essential to test whether demand is really small,

as our analysis indicates that it is. Even a relatively gross test would be sufficient to test central aspects of our analysis, for example whether our extrapolations are being materially distorted by the fact that some of cable television's attractiveness comes from the cleaning up of local signals as well as from the importation of distant network signals. It is essential that a large number of off-network reruns be shown on pay television, because the demand for such programs is likely to decline as more are offered. It is only if pay television is able to bid on a large number of programs that siphoning will be a serious regulatory concern. 8e1d

8e1e As in the case of movies, a full moratorium on the series rule, on certain pay operations, for a period of three years plus an optional three-year extension, seems appropriate. Because most off-network reruns come with advertising, a concurrent relaxation of the advertising prohibition should also be created. 8e1e

8e1f For sports, there are likely to be two periods to the data collection. In the next two or three years, initial data on demands for individual baseball, football and other key sports events will be generated, allowing raw bidding potentials for pay television and free television to be assessed. Later, it may be appropriate to determine the marginal revenues and costs of exhibiting different types of sports on pay television, if raw bidding potentials appear roughly equal. This will allow marginal revenues, costs and opportunity costs to be assessed, so that potential economic

interactions can be estimated. Another key issue is to what extent different types of sports events are viewed as substitutes by consumers. Substitutability, which is central to marginal revenue analysis, can be determined roughly during the next three to six years, perhaps determined well by the end of that period. 8e1f

8e1g Again, a full relaxation of the sports rule for certain pay television operations is desirable in order to collect the volume of data that will give a reliable data base. A three-year relaxation, followed by an optional three-year relaxation also seems appropriate, since data from the first three years will allow a determination of whether a second relaxation period can be created safely. 8e1g

8e1h For the sports rule, however, there is one concern. Our maximum upper-bound estimate indicated that networks made by interconnecting STV stations in a region might produce measurable interactions during the relaxation period. However STV seems likely to emerge considerably more slowly than our projection indicates and network interconnection should come even more slowly. So it still seems appropriate to extend relaxation of the sports rule to STV stations. 8e1h

8e1i One factor that cuts across these three categories is the need to collect a large amount of data. In part, a large quantity is needed because of expected program-to-program variances.

A greater need for quantity, however, stems from the fact that the FCC must determine how much interaction will be needed in the future if it to adopt a systems approach to television financing, not simply whether any interaction will occur. This requires sufficient data to reliably estimate marginal demand for individual programs. 8e1i

8e2 2. Difficulties and Their Solution 8e2

8e2a The recommendation for experimental relaxations is not a new one. Since late 1972 pay television spokesmen have been calling for a national moratorium on the rules. In general, two reasons have been cited for a moratorium. First, it would give the fledgling pay television industry more product to grow upon. Second, it would probe whether the antisiphoning rules are really necessary. This analysis, being an upper-bound estimation, does not bear upon the pay industry's possible need for programming. Its findings concur, however, on the need to probe the antisiphoning rules. 8e2a

8e2b The FCC has been nearly silent on past recommendations for moratoria. It seems to be, however, that three factors are causing the Commission to reject moratoria. The first is the problem of "grandfathering." Even if it is made clear to pay subscribers that they are seeing certain programs on an experimental, limited-term basis, it might be impossible to take programming away later. 8e2b

8e2c The second factor is the selection of pay television

systems (to reduce the grandfathering proble), by granting variances to only some pay television operations but not to others. Simply the mechanics of deciding among competing applicants would seem to be a major chore. Furthermore there might be political pressures to favor certain regions or at least to balance geographically the operations receiving variances. 8e2c

8e2d The third factor is tied to the other two. This is the cost/benefit of a program of experimental relaxations. If the FCC commits itself to a program of experimental relaxations, this will consume staff time in the analysis of results, and there may be pressure to radically alter the composition of the current rules or even to scrap them entirely. This could place a major burden on the Commission's staff. 8e2d

8e2e None of these factors, however, should be debilitating. Most directly, the fact that a program would consume Commission resources ignores the potential (and by our results, probable) need to create a new regulatory approach to pay television. Television is a very important service in America, and the FCC cannot validly ignore the benefits that a mixed system of financing production and distribution has brought to the print medium and to movies. 8e2e

8e2f Burdens on the FCC, however, can be greatly reduced by requiring operations that take advantage of a moratorium to collect

their own data and to submit them in a standard form, which we discuss below. This will not eliminate staff burden, because some analysis will still be needed within the FCC, but it should reduce the burden to an acceptable level. Furthermore, if the data are made public (subject to the reporting form protecting the privacy of individuals and the pay television corporation's identity), outside organizations are likely to submit analyses of their own. 8e2f

8e2g Both grandfathering and the selection of operations can be addressed with a single tool. This is the creation of a national moratorium in which participation by pay operations is voluntary, but in which only operations that agree to provide certain proprietary data may participate. This will eliminate the selection problem entirely, or at least reduce selection to well-defined technical characteristics of the pay operation. Because participation will be dependent upon the submission of proprietary data, participation should be somewhat limited, reducing the grandfathering problem. 8e2g

8e2h This approach solves the selection problem cleanly. It does not solve the grandfathering problem as nicely. However grandfathering does not seem to be a major problem to begin with. By the end of 1978, even by our upper-bound estimation, the pay industry seems likely to be only about a third of its ultimate size. Even if virtually all pay operations participate, there seems to be little danger of grandfathering a national system of pay television.

However it would definitely seem unwise to wait much longer to create a program of experimental relaxations. 8e2h

8e2i To further reduce the danger of grandfathering whole regions, a quota should be set, in which no more than 25 percent, say, of all cable subscribers in a region should be served by participating operations. To select operations to meet this quota, successive random selection from applications would be made until the limit is reached. For STV, only the first operating station in each of the STV networks defined by Table IV 9 would be permitted to participate. 8e2i

8e2j The Hartford STV experiment of the 1960's obviously motivated our proposal to remove difficulties by creating a participative program. However we have attempted to overcome the main difficulties of that experiment by defining exact data to be supplied by applicants. Most importantly, this means that selection need not drag on for months or even years. It also means that the FCC is unlikely to be stuck with the results from a single Pay television operation. 8e2j

8e3 3. Criteria for Participation 8e3

8e3a We have discussed how the preselection of minimum data to be provided will eliminate or satisfactorily reduce the major road blocks to a program of experimental relaxation. We now discuss the rather simple data that should be required. We discuss per-program

and per-channel charging separately, because these can provide different data. STV and pay cable are not discussed separately; although it is useful to compare STV and pay cable operations using the same charging mechanism, the data submitted would be identical. 8e3a

8e3b a. Per-Program Operations 8e3b

8e3b1 Per-program operations must first provide data on growth of their penetration in the community over time. If the pay operation is cable-based, growth in the penetration of the host cable system over time and the fraction of cable subscribers taking pay television must also be reported. For pay penetration, reporting should begin from the pay system start-up date; cable penetration history (if applicable) must be reported from a year before start-up (but not going back more than three years). If the pay company can report penetration in terms of the number of homes to which pay television has been marketed or is available to, this must be reported. 8e3b1

8e3b2 If any consumer survey has been performed previously, portions that relate pay television and cable (if applicable) penetration to consumer demographic characteristics must be reported. A brief demographic profile of the community and service area(s) must be provided. The applicant must also agree to do one demographic survey of the service area each year and to to obtain demographic data from its subscribers. At a minimum,

demographic information must include average age of the heads of the household, pre-tax annual income from all sources, and number of persons in the household who are living there and can watch pay television with some regularity. 8e3b2

8e3b3 For each run of each program shown during the moratorium, the cumulative percentage of subscribers purchasing the program, the price charged, and the number of showings must be reported. Correlations among all programs (within a single calendar year) and among individual programs and household demogrpahics must be reported. For movies, the percentages of subscribers purchasing a movie during the first run and each subsequent reissue must be reported. 8e3b3

8e3b4 All data must be reported for each calendar year, within three months after the end of the calendar year. 8e3b4

8e3c b. Per-Channel Operations 8e3c

8e3c1 Per-channel operations must first provide data on growth of their penetration in the community over time. If the pay operation is cable-based, growth in the penetration of the host cable system over time and the fraction of cable subscribers taking pay television must also be reported. For pay penetration, reporting should begin from the pay system start-up date; cable penetration history (if applicable) must be reported from a year before start-up (but not going back more than three years). If the pay company can

report penetration in terms of the number of homes to which pay television has been marketed or is available to, this must be reported. 8e3c1

8e3c2 If any consumer survey has been performed previously, portions that relate pay television, cable (if applicable) penetration to consumer demographic characteristics must be reported. A brief demographic profile of the community and service area(s) must be provided. The applicant must also agree to do six demographic survey of the service area each year and to to obtain demographic data from its subscribers. These surveys may coincide with ratings collection described below. At a minimum, demographic information must include average age of the heads of the household, pre-tax annual income from all sources, and number of persons in the household who are living there and can watch pay television with some regularity. 8e3c2

8e3c3 At least six times each year, the pay operation must conduct a ratings probe of its service area. This probe may use any reliable testing means but must be capable of resolving ratings to within a probable accuracy of plus or minus three ratings points. Any probes conducted in the service area must be reported. The parent company of a participating operation must conduct no greater number of probes on any of its nonparticipating operations than the average number performed on its participating operations. 8e3c3

8e3c4 For each program measured during these ratings probes, the cumulative percentage of subscribers purchasing the program and the number of showings must be reported. If possible, correlations among programs (within a single probe) and among individual programs and household demographics must be reported. For reissues shown during the probe, first-run ratings must be reported if available and each houehold probed should be asked if anybody in the household has previously viewed the movie on pay television, on the current operation. 8e3c4

8e3c5 If there are several participating per-channel operations in a television market, it will be permissible for these operations to cooperate in conducting ratings probes. However, the number of regional probes that must be conducted will rise to six plus the number of operations participating. In addition, at least seventy five percent of the programs offered by different systems during the sweep period must be identical. 8e3c5

8e3c6 All data must be reported for each calendar year, within three months after the end of the calendar year. 8e3c6

8e3d c. Per-Channel Versus Per-Program Data 8e3d

8e3d1 It is obvious that per-program operations offer a greater precision of information than per-channel operations. On the other hand, there will be many more per-channel than per-program operations during the next six, and especially the next three, years.

Per-channel systems will therefore provide a rather large volume of information on viewing patterns. 8e3d1

8f F. Summary of Recommendations 8f

8f1 Our results indicate that the fundamental principle upon which the current pay television regulations are based, i.e., absolute protection for advertiser-supported television, is not well-founded. This principle was created in the mid-1960's, when a lack of information about consumer demand for pay television made stringent anticompetitive regulations a prudent choice. The data presented in our study, whoever, indicate that pay television demand will not be so large as to swamp free television in the absence of regulations. Rather, our upper-bound projections indicate negligible to moderate economic interactions. If these results are correct, then the FCC should immediately begin to reassess its fundamental policy toward pay television regulation. 8f1

8f2 For the long term, the FCC must develop a regulatory policy appropriate for a stituation in which pay television and free television are viewed as a joint system for financing television, a system which already includes network television, independent television, movie theaters, sports arenas and cultural theaters. If pay television affects this sytem negligibly, little regulation of pay television will be needed. But if pay television changes the current system materially, the FCC must develop regulations to ensure

that changes are beneficial. These regulations need not be strongly anticompetitive; theaters and television, for example, compete for theatrical movies, but their joint revenues allow the production of more expensive movies than either could afford alone. 8f2

8f3 This long-term regulatory change will not come immediately. At present there is too litle data to even formulate alternative regulatory approaches precisely, much less to select among them. Yet the FCC and other organizations must take decisive steps in the near future if future approaches are to be well-founded. Some organization, for example, must formulate proposals for alternative regulations soon, so that when hard data become available, alternatives will be understood and ready for implementation. This fromulation must be done fairly soon because, as indicated in the Conclusions (Section V), a great deal of information will soon be available, and the FCC must organize itself to assimilate and understand future data, so that it can act rapidly. 8f3

8f4 It is important that general policy formulation and data collection come quickly. In the past, for example in the case of trucking-train competition, an agency (in this example, the Interstate Commerce Commission) have tended to adopt a policy of absolute protection for a conventional medium, only to find later that the public would best be served by a system that treats both the new entrant and the established server as equals. By the time the need to scrap the anticompetitive policy becomes has become realized,

however, intellectual and legal precedents have tended to make conversion very difficult and ultimately incomplete. 8f4

8f5 While all future actions will be important, there is one pressing and critical action that the FCC must take in the very near future if needed data are to be available when needed. This is to create a fairly broad program of experimental relaxations to the current antisiphoning rules. These rules forbiding pay television to offer programs roughly like those shown on free television today. But the rules have another, undesired, effect: they tend to prevent precisely the kinds of market tests that are needed to collect data critical to the estimation of potential economic interactions between pay television and free television. Unless a substantial number of pay systems are given limited-term exemptions from the antisiphoning rules, the large amount of data that will be generated naturally by pay television during the next three to five years will be insufficient for regulatory action. There will remain a large and critically-placed core of uncertainty about potential interactions. If relaxations are allowed, on the other hand, there should be sufficient data for rather decisive regulatory actions. 8f5

8f6 Experimental relaxations have been proposed to the FCC in the past, and the FCC has rejected these proposals on several grounds: that too many pay systems would be grandfathered by such relaxations, that it would be politically impossible to select pay operations "for special treatment", and that the results would be

insufficient for the resources they would require. All of these reasons, however, presuppose that current regulations are well-grounded, and that only relatively cosmetic changes need to be made in the future. If strong revisions may be needed, however, these argmenents break down. 8f6

8f7 Overall, the FCC stands at a crossroads today. It has created a new addition to the financial structure of video, which is now a $6.4 billion dollar industry including conventional television and movie theaters. Television is now viewed about 6 hours a day<1> by the average household and represents America's dominant source of fiction, entertainment, and national news. While the current value of "free" television, which costs the average household about $75 per year is indisputible, this only stresses the importance of home-video service to the public. If pay television can substantially change this system of financing, or change it even modestly, the potential benefits of a open competitive regulatory policy to the public interest may be very large. The FCC must begin to probe the benefits of a full system of television financing instead of simply trying to preserve the current financial system, itself a historical accident, as an unalterable regulatory absolute. 8f7

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