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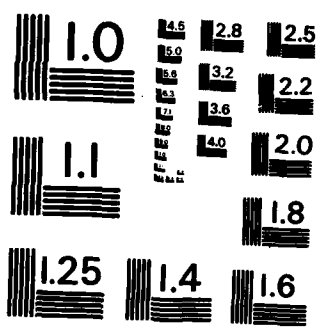

AFHRL-TP-84-17

(12)

AIR FORCE HUMAN RESOURCES LABORATORY

OFFICE AUTOMATION BENEFITS

By

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ANALYSIS AND EVALUATION OFFICE
HQ Air Force Human Resources Laboratory
Brooks Air Force Base, Texas 78235

July 1984
Final Technical Paper

AIR FORCE SYSTEMS COMMAND
BROOKS AIR FORCE BASE, TEXAS 78235

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This paper has been reviewed and is approved for publication.

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFHRL-TP-84-17	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Analysis and Evaluation Office Air Force Human Resources Laboratory 6b. OFFICE SYMBOL (If applicable) AFHRL/OA	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State and ZIP Code) Brooks Air Force Base, Texas 78235	7b. ADDRESS (City, State and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Air Force Human Resources Laboratory 8b. OFFICE SYMBOL (If applicable) HQ AFHRL	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State and ZIP Code) Brooks Air Force Base, Texas 78235	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO. / PROJECT NO. 9981 / TASK NO. 02 / WORK UNIT NO. 01

11. TITLE (Include Security Classification)
Office Automation Benefits

12. PERSONAL AUTHOR(S)
Boynton, Thomas A.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Yr., Mo., Day)	15. PAGE COUNT
Final	FROM _____ TO _____	July 1984	10

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB. GR.		
			electronic mail	proofreading time saved
			mailway	retyping time saved
			office automation benefits	word processing

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Office automation benefits at AFHRL are derived primarily from the Wang word processing system. Three major benefits are identified: retyping time saved, proofreading time saved, and electronic mail. Each of these benefits is assigned a monetary value based on system utilization statistics automatically collected during daily operations.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION	
UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐		
22a. NAME OF RESPONSIBLE INDIVIDUAL Nancy A. Perrigo Chief, STINFO Office	22b. TELEPHONE NUMBER (Including Area Code) (512) 536-3877	22c. OFFICE SYMBOL AFHRL/TSR

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE

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This paper is published in the interest of scientific and technical information exchange.

PREFACE

Data used in evaluating the benefits described in this report were collected by a computer program which runs in background mode on the Wang word processing system. Staff Sergeant Robert Cunningham of the Technical Services Division worked closely with the Analysis and Evaluation Office in determining an effective trade off between the type and quantity of data collected and the programming complexity required. SSgt Cunningham performed the actual coding and debugging of this software and proved to be an indispensable partner in this entire effort.

OFFICE AUTOMATION BENEFITS

Effective utilization of Air Force Human Resources Laboratory (AFHRL) research results places a heavy clerical workload on the typical AFHRL office environment. Even before a final R&D product is available, extensive time is dedicated to the management and review process. A 1981 unpublished report on AFHRL office operations prepared by the Booze-Allen Company gave estimates of typical manpower consumption for various management and review activities. Technical Management Reviews, Financial Management Board Review Packages, and Research and Technology Plans each consume significant in-house labor resources. Sample findings by Booze-Allen were that the typical final technical report consumes almost 2,300 professional hours and 1,150 staff hours, and of these, 35 percent are dedicated to clerical tasks. Even professionals spend between 4 percent and 32 percent of their time on clerical tasks.

The Wang Office Automation System

By January 1983, AFHRL was spending about $200K per year on lease fees for Wang office automation equipment, part of which was associated strictly with word processing capabilities. Because of these fees and the intensity of laboratory clerical office activity, the Commander directed the Analysis and Evaluation Office to study office automation benefits.

The scope of this study is limited to AFHRL office automation activities at Brooks AFB, Texas. Other AFHRL operating locations were not included because automatic data collection could be readily implemented only at the Brooks AFB site. If the ratio of office automation benefits to costs is assumed to be similar at the outlying divisions, the results of this study can be generalized to AFHRL as a whole. During the period of this study, office automation at AFHRL (Brooks AFB) was provided by the Wang VS-80, with 21 work stations and 9 printers. Some of the benefit categories associated with this system are as follows:

1. Increased Typing Speed
2. Reduction in Time Spent Retyping Material
3. Mailway (Electronic Mail)
4. Suspense Management
5. Electronic Filing and Retrieval
6. Electronic Briefing System
7. Automated Readability Scoring

The benefits of several of these categories are difficult to quantify. Others, such as the electronic briefing system, have only minimal or sporadic usage. The most significant quantifiable category is the reduction in time spent retyping previously typed material. The Analysis and Evaluation Office, with the help of the Technical Services Division, grew an automated data collection system which produces both detailed and summary information regarding how much time is saved because the word processor alleviates the need to retype large amounts of documentation.

Retyping Time Saved

The data collection system measures the average time per line spent in the initial creation of each document. This measure is then used as a baseline to estimate how much time each subsequent reaccomplishment of the document would have taken if the operator had retyped it. From this estimate is subtracted the amount of time spent revising and printing the document. This results in an estimate of retyping time saved for that document. Results are accumulated several times per hour for all active documents. On the basis of three months of data collection, office workers at AFHRL (Brooks AFB) save about 600 hours per month. That is, if typing ouptut were to be achieved without word processing support, it would require an additional 600 man-hours per month. This converts to four full-time personnel.

Although the average secretarial salary at AFHRL is about $8 per working hour, it is not realistic to value all 600 hours saved at this rate. Due to the nature of Air Force hiring policies, it is not realistic to assume that the Laboratory could eliminate the Wang system and hire four more full-time typists to take its place. It is assumed that the number of authorized positions would not be increased to provide for more personnel because of the added typing requirement. Some of the increased clerical workload resulting from elimination of the Wang system would most likely be performed by AFHRL professionals who already spend about 8 percent of their time on clerical activities. It is assumed that contract personnel would be hired to perform the professional work pre-empted by the increased clerical load on the professionals. Thus, at least a part of the 600 hours saved should be valued at about $50 per hour, which is a conservative estimate of the cost per professional contract labor hour including overhead. Assuming that 50 percent of the increased workload could be eliminated as not essential, this would result in an increased expenditure of $50 x 300 hours per month or $180,000 per year. This provides a conservative estimate of the benefit associated with retyping time saved of $180,000 per year.

Other Benefits Associated with Office Automation

Approximately 110 mailway (electronic mail) documents per week are processed by the AFHRL office automation equipment at Brooks AFB. This includes all mailway documents for which AFHRL at Brooks is either the originator or recipient. Assuming that documents sent by mailway average three pages in length, the average transmission cost per document is 42¢. This is based on the fact that a three-page document would have 9,000 characters or 72,000 bits of information. Transmission occurs at 2,400 bits per second over a telephone line with a $25 per hour usage rate, but message handling protocols consume about the same amount of time that data transmission takes. This is due to incomplete automation of the message handling process at the outlying divisions and roughly doubles the long distance telephone charges. The least expensive alternative for achieving next day delivery of these documents is the Express Mail service provided by the United States Post Office, and there is no guarantee of next day delivery! The minimum charge for this service is $9.35 per document. Assuming that 66 percent of the mailway documents handled by the AFHRL office automation equipment at Brooks AFB are outgoing documents and that they are equally distributed among the three outlying divisions, an

average of five documents are sent to each division daily. In most cases these five documents could be batched so that one Express Mail container per duty day would be sent to each outlying division. The annual cost of this alternative would be $7,293 ($9.35 per package x three divisions x 5 days per week x 52 weeks per year).

By sending these same documents via mailway, annual costs of about $1,594 are incurred (42¢ per document x 73 outbound documents per week x 52 weeks per year). The annual Express Mail cost avoidance attributable to the office automation equipment at Brooks because of outbound mailway document transmission is $5,699 ($7293 - $1594). Any cost savings resulting from inbound documents should be attributed to office automation equipment at the outlying divisions, the costs and benefits of which are not considered in this paper.

Using word processor output, a professional needs only to check the accuracy of a requested change without proofreading the entire document, since typing errors will not be introduced in the retyping process. When retyping is performed manually, however, proofreading of the entire document is needed to make sure additional typing errors have not been introduced. Assuming that proofreading takes 50 percent as long as the typing of a document, and that proofreading time per document is reduced by 50 percent because of word processing, professional proofreading time saved amounts to 50 percent x 50 percent x 300 hours/mo, or 75 man-hours per month. Valuing these man-hours at $50 each results in a proofreading time savings worth $3,750 per month, or $45,000 per year.

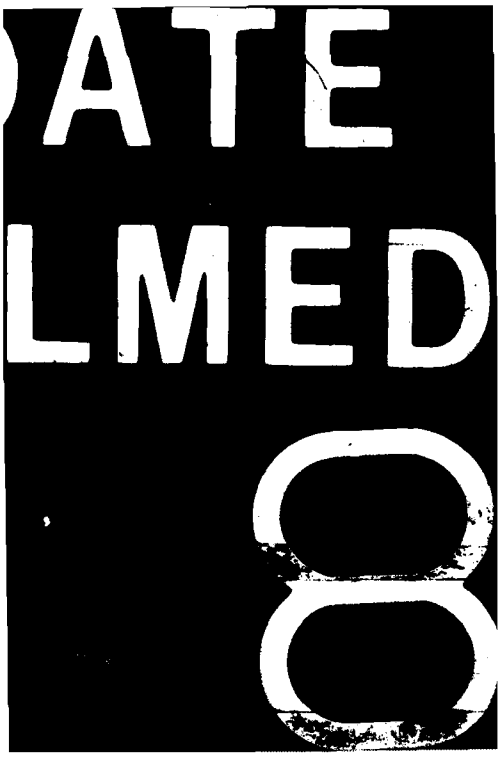
Office Automation Costs

Table 1 has a listing of hardware/software associated with the office automation benefits described above. The lease rates shown are the monthly rates that AFHRL would have to pay if none of the equipment was owned by the Laboratory. The actual lease charges, however, are significantly lower than shown because much of the equipment is Laboratory owned. Monthly lease agreements include full parts and labor maintenance coverage.

This analysis shows that benefits derived through use of the office automation system at AFHRL exceed $230K per year. This is about one and one-half times the annual cost of leasing the system. Other benefits, such as suspense management, electronic filing and retrieval, and automated readability scoring, though less easily quantified, increase this office's confidence in the cost effectiveness of the system.

Table 1. WANG System Office Automation Costs

Quantity	Item Description	Monthly Lease Per Item	Total Monthly Rate
Hardware			
1	VS - 80	$1302	$1302
2	IOPs (Input/Output Processors)	$135	$270
1	TC IOP	145	145
1	TC IOP	185	185
1	Disk IOP	180	180
2	Disk Drives	853	1706
19	Work Stations	194	3686
1	Work Station w/Floppy Disk	373	373
1	System Operator Workstation	----	----
9	Printers (Daisy Wheel)	248	2232
1	Band Printer	404	404
	AT&T Modem & Fixed Charges	820	820
	Hardware Sub Total		$11,303
Software			
1	BASIC Compiler	135	135
1	COBOL Compiler	135	135
1	Word Processing Software	224	224
Communications Software			
1	TC-2780/3780 (Telecommunication software)	45	45
1	VS/TTY (Virtual Storage Teletype)	68	68
1	Mailway Level 3	404	404
	Software Sub Total		$1,011
	Total Monthly Lease Rate		$12,314
	Total Annual Lease Rate		$147,768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