# AIR WAR COLLEGE

# RESEARCH REPORT

## ELECTRONIC MAIL: IMPACTS ON CURRENT WAYS OF DOING BUSINESS

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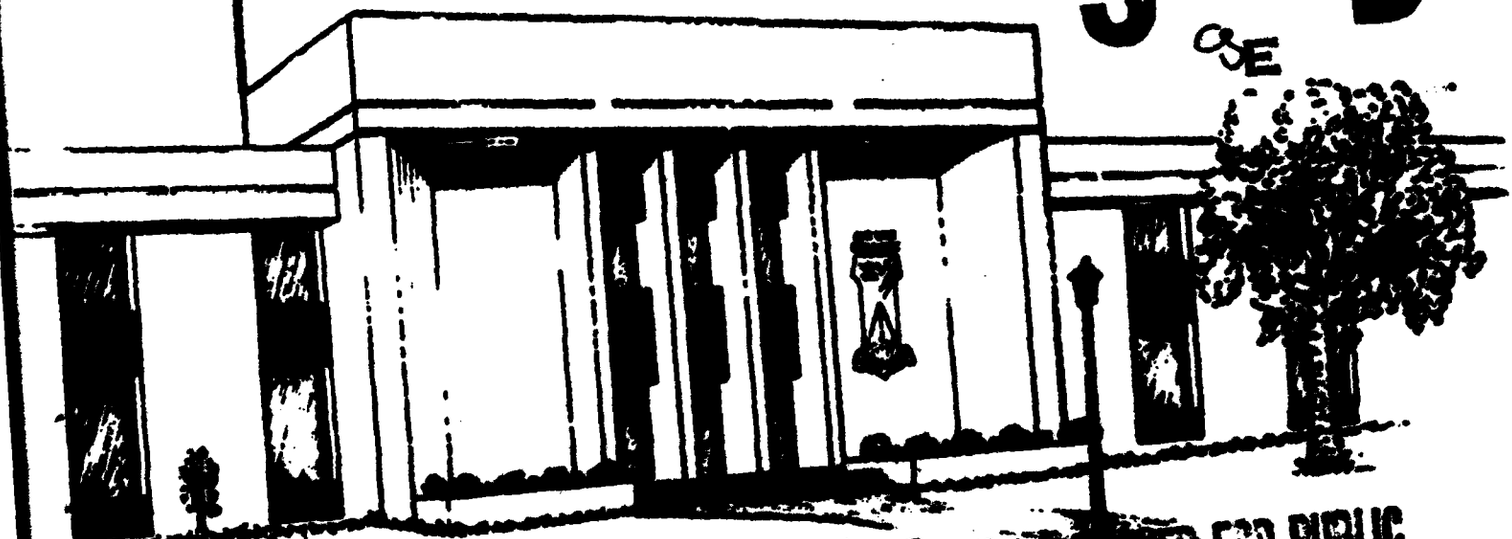

AIR UNIVERSITY
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# ELECTRONIC MAIL:
# IMPACTS ON CURRENT WAYS OF DOING BUSINESS

by

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A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE RESEARCH

REQUIREMENT

Research Advisor: Major Charles E. Zimmer, Jr.

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AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Electronic Mail: Impacts on Current Ways of Doing Business

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The growth of personal computer availability in the Air Force has not been matched with a corresponding growth in utilization. While the office computer is widely used for wordprocessing, its communication application has not been properly recognized by the Air Force leadership. The absence of an effective Air Force policy on electronic mail has limited the acceptance and utilization of a valuable technology.

A discussion of what electronic mail is and how it is utilized in the non-government sector is presented. The merits of electronic mail and applicability to the Air Force is examined. Following a discussion of the background of Air Force attempts at defining policy, some policy recommendations are offered.

(JE3)

## BIOGRAPHICAL SKETCH

Lt Colonel Jon S. Gingerich is a native of Denver, Colorado and entered active duty in 1966. Since graduation from pilot training in 1967, he has accumulated over 5,000 flying hours including 240 combat hours in Southeast Asia flying C-130s. His interest in computers began in 1980 and he is now on his third personal computer system. He uses electronic mail both at work and at home and has been actively involved in promoting computer literacy in the units to which he has been assigned. Lt Col Gingerich holds a B.S. from the University of Arkansas, and an M.S. from Troy State University, Alabama. He is a graduate of the USAF Squadron Officers School, the Air Command and Staff College, and the Air War College, Class of 1988.

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# CHAPTER I

## INTRODUCTION

Electronic mail is slowly making its way into the office environment of some Air Force organizations. Widespread acceptance and utilization of this technology has been hampered by the lack of a definitive policy from top-level management within the Air Force. While there have been attempts to establish such policy, none have been successfully implemented. (1;2)

The technology of electronic mail is not new. The oldest form of electronic mail is the telegram, and Morse sent the first one in 1844. The telex network was introduced in 1958 by Western Union. The electronic mailbox system was introduced in 1972 by Scientific Time Sharing Corp. "This made it possible for electronic mail to flow through a computer system." (3:97) This convergence of computers and communications paved the way for computer-based message systems and the concept of electronic mail as presented in this paper. (4:84)

Broadly speaking, electronic mail includes such things as telex, facsimile, voice mail, and computer-based message systems. However, other than some basic definitions, the thrust of this study is focused on computer-based message systems.

Computer-based message systems can consist of several powerful, main-frame computers spread around the country and interconnected through the telephone system to form a network. Users can access the network from their office by using a personal computer and a modem. A modem is the connecting piece of hardware that links the computer to the telephone system. The Department of Defense has established a world-wide network known as the Defense Data Network (DDN). The DDN provides Air Force managers with communication capabilities that are independent of more traditional forms of mail or the geographic location of the intended recipient. However, these capabilities have not reached wide-spread utilization within the Air Force.

The purpose of this paper is to look at the capabilities of electronic mail technology and assess its potential impact on the way the Air Force conducts business. Specific objectives of this paper are to:

(1) Determine what electronic mail is and compare it to other forms of communication.

(2) Examine the impact of electronic mail on non-Air Force organizations through the use of case studies.

(3) Review the Air Force policy on electronic mail.

(4) Determine what policy changes are needed to take advantage of electronic mail.

(5) Determine if the use of electronic mail will increase the information available to the decision makers.

(6) Discuss what type of information can be transmitted by electronic mail.

(7) Conclude with a recommended system configuration that will improve the flow of information within and between Air Force organizations.

# CHAPTER II

# ELECTRONIC MAIL BASICS

## What Is Electronic Mail?

Electronic mail can be thought of as the process of electronically transferring textual information from one person to another. Excluding parcel post, electronic mail is a possible alternative to nearly any other type of traditional mail service. Any document that can be stored electronically can probably be communicated electronically. (5:3-4) A broad-based definition of electronic mail as the process of sending messages electronically would include a wide range of technologies, a few of which are described below:

a. Facsimile. Facsimile is a system that allows transmitting handwritten or typewritten documents and graphics between similar terminals using the phone lines. Both sender and receiver need access to the terminals and sending a message to multiple addressees requires multiple telephone calls.

b. Telex. Telex is sending information using the traditional teletypwriter equipment. The message is typed at the telex terminal and transmitted via phone lines to the recipient's machine. Telex requirements in the Air Force are handled by the AUTODIN system.

c. Voice mail. Similar to an answering machine, voice mail systems receive, store, and retrieve messages. However, the messages are stored on a central computer that serves many users. The messages are converted to a digital format for storage, and later reconstructed to voice for retrieval.

d. Computer-Based Message Systems (CBMS). In a CBMS, a central computer system maintains a large number of electronic mailboxes, one for each user. Access to the system is accomplished using a terminal such as a personal computer that is connected to the CBMS through the telephone network. Specialized computer software and a modem allow the user to dial up the CBMS on a personal computer and send or receive messages (mail). (6:26) Other popular applications of computer-based message systems are bulletin board systems and computer conferencing (also called teleconferencing). The bulletin board system (BBS) uses the computer-based message system to post, file, and retrieve messages from an individual to a group. Groups are defined by the topics of the messages. (7:8) A bulletin board may be divided into several different interest areas with a wide variety of topics. There may also be a files area, such as DIAL-A-LOG on the Defense Data Network (DDN), which allows users to download programs from the bulletin board to personal computers. Access to

specific areas is often controlled by the use of passwords or special access codes. Computer conferencing is a synchronous communications effort in that two or more users are connected through the network at the same time. As characters are typed on one screen, they are also being displayed on the screens of the other conferees. Real-time communication takes place through alternate inputs by each user.

It is this technology of computer-based message systems that this paper will be addressing. Electronic mail is then the transfer of information from one person to another through a computer-based message system using electronic mailboxes. Electronic mail can support local or long distance requirements. Another way to think of electronic mail is that it is a computer-based message system to compose, edit, send, and file person-to-person messages. (7:52) This person-to-person capability is the most important feature of the system. It is important to note that the messages are not sent to a geographic location where one must go to receive them. Messages are sent to a central data base where they are stored in electronic mailboxes and are available for retrieval at the convenience of the recipient without regard to location. Individual access codes and passwords are assigned to each user to insure privacy and authorized access to the system.

Local or intra-organizational electronic mail can be supported by a local area network (LAN). A LAN provides users the capability of connecting several microcomputers to a central computer (micro or main-frame) within a limited area such as an organization for the purpose of sharing information and sending electronic mail. This network can either be dial-up or hard-wired. In a dial-up LAN, the office computer is connected to a standard telephone outlet through a modem. Access to the LAN is accomplished by dialing the appropriate telephone number of the central computer. In a hard-wired LAN, there are dedicated outlets for each computer on the system. Access to the LAN is accomplished merely by physically connecting the computer to an outlet. A dial-up system is much cheaper that a hard-wired one but it does tie up a telephone line while it is in use.

Long distance (inter-organizational) electronic mail requires the capability to connect microcomputers with large main-frame computers that are geographically separated from the organization. This could involve a vast complex of computers spread over the world connected by long-haul telephone lines, satellite relays, fiber optic cables, or radio links. Several networks can be interconnected to each other to form larger networks. These networks can be interconnected through "gateways" to

form a worldwide system of data networks similar to the telephone system. The Defense Data Network (DDN) is a large military data communications internetwork operated for the Department of Defense by the Defense Communications Agency. The DDN is not available for use by the general public, nor is it intended to compete with comparable commercial network services. (8:6.1-6.3) Some commercial vendors that offer these services are CompuServe, The Source, MCI Mail, Easylink, and Ontyme. (9:193)

How Does Electronic Mail Work?

The system computer is usually connected to the telephone network, so that it can be accessed from almost anywhere in the world. The terminals themselves do not have to be permanently connected to the system. With a properly equipped portable computer, users can access the system from anywhere there is a telephone. Access to many of the commercial services is enhanced by specialized data networks called "packet networks". A packet network is a telephone-based service that offers a low-cost timesharing access for remote users. Access from most cities requires only a local phone call to this service. (6:26) Access to the DDN is available through a local call at many installations or a toll free number from any telephone.

Most systems require pre-registration for assignment of user identification information and passwords

before access to the system is allowed. The user calls up the CBMS computer from a personal computer via the telephone and a modem. Once connected, the system queries the user for some identifying information such as user name and password. These options may be assigned by the system's host administrator initially but may be changed by the user. In fact, the user is encouraged to change his password occasionally to prevent unauthorized access by others. After the system verifies the user, it checks his electronic mailbox for any mail that may have come in since the user's last access. If there is any new mail, the user will be given a list of the messages that have not been read. At this point, the user has the option of reading each message and responding immediately or reading and downloading the message to his computer for future reply. Many services offer online wordprocessing capability for composing messages. With connect charges on commercial systems varying from $6.00 -$30.00 per hour, it is generally advisable to download mail for off-line processing. Besides the high cost, most online wordprocessing programs are cumbersome and inadequate when compared to dedicated wordprocessing programs normally used in the office. It is very easy for the user to write the message using a familiar wordprocessing program offline and then connect to the system and upload it for transmission.

The message is then transmitted instantly to the addressee's electronic mailbox where it will be stored until it is read and retrieved or discarded. The system can handle multiple addressees with the same speed and efficiency and requires only the one transmission.

## What Are the Benefits?

### Electronic Mail Compared to the Telephone

It does not really matter if the other person is readily available when the sender wants to communicate. This becomes even more of a factor when people are separated by multiple time zones. Often a typed message is less likely to be misunderstood than a verbal one. Costs can be reduced, since only necessary information is sent, instead of spending several minutes on the telephone in social conversation. Several people can be contacted by the sender with only one transaction. Downloading the message provides a written record of the communication. (6:26-27) Electronic mail can eliminate telephone tag. A common occurrence in conducting day-to-day business is the unavailability of persons by telephone. The transference back and forth trying to establish a telephone conversation is called telephone tag. In an article in the computer magazine Datamation, an electronic mail enthusiast expresses his point of view as follows:

> Most businessmen hate the phone. It is disruptive, inefficient, frustrating --something out of the horse and buggy era and totally inappropriate to the modern

> business environment.
>
> If I want to communicate with Mr. X by phone, I have to locate him. This is often hard to do and, as the modern businessman becomes more and more mobile, it becomes harder and harder. Where in the world is Mr. X?
>
> If the time is during normal business hours, one assumes he is at his desk. But often he's not. He's in a meeting down the hall, he's in the men's room, he's in transit to another office -- perhaps he's not in the building at all. He may be sick, out to lunch, making a customer call, in a car, in an airplane... One thing is certain: in today's fast-paced world, Mr. X is hard to find.
>
> Suppose I do know where Mr. X is, and that he has a phone nearby, and that the phone is not busy. What makes me think that Mr. X is willing to be interrupted? The chances are that he is not, and I can't say that I blame him, for just as often I am not. Often I'm in a meeting, and sometimes I say I'm in a meeting, because I'm doing some work that I would like to continue doing. (Even to say I'm in a meeting requires an interruption in my work.)
>
> So what happens? I call Mr. X and leave word. He calls back and leaves word. I call him back and leave word. He calls back....You get the picture...(10:80-81)

In addition to wasting a considerable amount of time just trying to reach the other party, there is often much socializing before business is discussed. (5:31) Electronic mail allows users to schedule when they receive their messages rather than put up with the random interruptions of the telephone.

Electronic Mail Compared to Conventional Mail

The big advantage here is speed. The electronic message is in the recipient's mailbox in seconds. Users do not have to be in the office to receive their mail since they can access the system remotely. (6:27)

## Electronic Mail Compared to Facsimile or Telex

Electronic mail does not require the specialized equipment needed for facsimile or telex. Any terminal or personal computer with a modem can access the system. The computer can be at the user's desk instead of having to go back and forth to a message center. Electronic mail messages can be answered or forwarded in the same session, while facsimile and telex require a separate transmission. (6:27)

The major advantages can be summarized as (1) elimination of telephone tag and breaking down the time zone barriers, (2) faster speed over paper mail, (3) improved flexibility with remote access, (4) better productivity because of fewer interruptions, and (5) equipment simplification over facsimile and telex.

## What Are the Drawbacks?

Unlike the telephone or facsimile, electronic mail requires computer and typing skills. Messages must be typed on a terminal to get into the computer-based message system. The most often cited problem is mailbox lag. While the computer-based message system can place mail in the recipient's mailbox within seconds, it remains there unread until the user calls to get his mail. Therefore, users need to check their mail regularly. A solution to mailbox lag would be the use of a CHECK command that would enable

the sender to check whether or not a particular message has been read by the recipient yet. (6:27) This capability is not available with the electronic mail programs available on DDN.

According to the International Data Corp., these are major obstacles to blanket acceptance of the technology:

> An effective network requires all users to have a terminal, preferably located no further away than the telephone where they work.
>
> Electronic mail systems still require learning certain computer skills. These commands must be kept to a minimum because in competing with the telephone, electronic mail is going against a technology that has been familiar to even the most nontechnical of us.
>
> The system is still limited to short messages in most cases. There are many instances when longer documents need transmitting and, to be effective, electronic mail must be able to address this in a practical manner.
>
> Communication between different systems is still very limited, despite the coming standards. Until those standards are effectively in place, the drawbacks of incompatibility is severe. (4:84)

## CHAPTER III

## ELECTRONIC MAIL CASE STUDIES

Before examining the significance of electronic mail in the Air Force and assessing its future, two case studies will be examined to look at what effect electronic mail has had on other sectors of the population.

### Lincoln National Corportation

The first case study is Lincoln National Corporation in Fort Wayne, IN. as described in the August 1987 issue of The Office. Lincoln National is the 15th largest diversified financial services corporation in the U.S., with 4000 employees located at the home office in Fort Wayne. The paper-intensive nature of the service it performs suggested a try at technology as a solution to the growing paper and communication problems the company faced. The company installed a prototype office automation system in 1979 with the hopes of reducing the flow of paperwork and extending usable computing power to nonprogramming employees. After eight years and ten million electronic messages, an improved version of that system serves more than 4000 users and is an integral part of the company's business today. According to James A. Tunis, vice president, Lincoln National Information Services, Inc.:

> Two important themes emerged during the growth of the internally developed system. First, electronic

> mail (EM) is an invaluable corporate tool, even among users in the same building. Second, the value of EM is increased dramatically when it is coupled tightly with other end user-oriented tools such as word processing, spreadsheets and data base tools. The ability of such an integrated system to enhance mail beyond notes and traditional documents is a qualitative improvement.

Electronic mail has affected the employees at Lincoln at all levels, from secretary to CEO. All 250 secretaries are full-time users of the system. The word processing capabilities have made typing a smaller part of the secretary's job. This typing workload is further reduced since more principals are using the system. In some cases this has allowed one secretary to serve a complete work group that required multiple secretaries before electronic mail was introduced. Electronic mail helps managers improve their knowledge of a situation in which they have direct control; and reduces telephone tag and unnecessary meetings with subordinates.

Electronic mail helps professionals disseminate information more effectively. Information can be sent where it is needed in a timely manner. In one case, a document of broad interest was distributed to 20 people. Within two hours it had been forwarded to 150 other interested people.

All of Lincoln's top 100 executives use the system, and all but three or four check their own mail and compose out-going mail on their own terminal. And about 60% have

terminals at home. Chief Executive Ian M. Rolland says,

> Before electronic mail, I would return from a trip and find my desk piled and a line of people waiting. Now I get home, work through my mail, and go in the morning to face a normal day.

Mr. Rolland estimates the system improves his own productivity 10-15%. The company administered a survey to users of the electronic mail system to subjectively evaluate its effect on their productivity. Secretaries reported a 20% improvement and executives reported a 14% improvement. "Currently, the company's best estimate of the system's effectiveness is a $6 million annual payback on a $2 million expense." (11:66-67)

Michigan Bell Telephone Company

The second case study is Michigan Bell Telephone Company as related in November 1986 issue of Infosystems. Michigan Bell is a large company with 19,000 employees spread throughout the entire state of Michigan. Electronic mail has proven to be an easy way to keep the boss informed of current issues statewide. The experience of the company has shown that once managers try electronic mail they will use it again and again. Like many Air Force organizations, Michigan Bell works around the clock. Electronic mail has solved many of the communication problems associated with shift work. The evening shift uses it to communicate concerns and plans to the day or

afternoon shift. Using electronic mail has become a daily routine at shift change time and it prevents lost paper information.

Each of Michigan Bell's senior managers has a desk terminal linked to the electronic mail system, and they use it. Their top managers have been provided with a home microcomputer that is linked to the electronic mail system. This is considered to be a part of their corporate executive communications system. The company places considerable value on the ability of a senior management person to return home from a trip and access the electronic mail system to find out what has been going on at the office. According to one company official, it saves the executive about an hour of update time the following morning.

When asked if the system pays for itself, Earl Ross, an Information System director for the company states:

> You have to set a price on the value of instant, accurate information. And you have to establish the value of communication to your work force. We think both are extremely important in today's competitive marketplace. (12:56-57)

## CHAPTER IV

## ELECTRONIC MAIL IN THE ARMY

The command policy of the US Army Information Systems Command (USAISC) is to utilize electronic mail for unclassified record traffic to the maximum extent possible. Electronic mail may be used to transmit unclassified, FOUO, and other sensitive information. Record retention is the user's responsibility in accordance with AR 25-400-2. Discretion is advised when transmitting the following information:

a. Information covered by the 1974 Privacy Act.

b. Sensitive but unclassified Government information relating to operations, plans, system acquisition, and personnel.

c. Preaward contractual information, asset accounting, or authorization data of dollar value greater than $1,000,000.

d. Trade secrets and non-Government information being retained on an agreed-upon confidential basis.

Electronic mail should be used as an alternative to the AUTODIN system to reduce the volume of traffic on that system. Electronic mail should be used in lieu of hard copy correspondence, facsimile, and U.S. Postal System where benefits of cost, timeliness, or productivity can be

realized. Electronic mail is for official government business, and there are no designations of formal or informal. There is no distinction made between electronic mail used to task or respond to a tasking and electronic mail used to exchange information between action officers, etc. Electronic mail will be addressed to office symbols and not individual's names. A "Pass to ..." line could be used at the beginning of the message to route it to a particular individual within that office. (13)

# CHAPTER V

# ELECTRONIC MAIL IN THE AIR FORCE

## Background

Responding to a 1984 Department of the Navy memorandum which requested guidance on several issues related to electronic mail, the Joints Chiefs of Staff (JCS) issued a memorandum to the service chiefs and defense agency heads on the subject of electronic mail. In its June 1985 memo, the JCS recognized electronic mail as an acceptable means of informal communication between individuals or organizations utilizing computer-to-computer data transfer technology. Electronic mail did not include the formal record communications such as AUTODIN. The JCS gave commanders the authority to designate electronic mail as directive or formal in nature with the stipulation that electronic mail outside the chain of command would be considered informal information unless other prior arrangements were made between organizations. The JCS added that the evolution of electronic mail may at some later time result in electronic mail being considered formal throughout the Department of Defense. Other key elements of the JCS memo were:

a. All electronic mail systems were to implement protocols specified in Military Standards 1781,1778, and

1777 to support interoperability between electronic mail systems across the Department of Defense.

b. Each service and agency was to determine the other electronic mail implementation details such as specific hardware and software.

c. Reaffirmed existing Department of Defense policy requiring the use of the DDN for long-haul communications services.

d. Individual users should access the DDN as close to their electronic mail system as possible.

e. Services/agencies must develop procedures to minimize character at a time transmissions across the DDN.

f. Security and privacy with each electronic mail system is a user responsibility and must be provided as required by applicable directives. (1)

There is no clear record of this guidance ever going beyond the service chiefs, at least on the Air Force side. (14)

In December 1986, the Command, Control, Communications, and Intelligence (C3I) Directorate in the office of the Assistant Secretary of Defense initiated an effort to establish definitions for formal and informal message handling service. The idea of formal message service was AUTODIN and was characterized by rigid adherence to a specified set of directives. Informal

message service was essentially everything else, including electronic mail, and was characterized by a lack of constraints with its use. It was to be routine and non-critical in nature which lessened the requirement for timely and verifiable delivery. (15)

This effort failed to produce any results or policy, and a follow on effort to combine the formal and informal into a single message handling service was unsuccessful as well. The Defense Communications Agency is now attempting to get industry inputs on what is needed to develop an integrated (formal/informal) message handling service to include electronic mail. (14)

In January 1987, HQ AFCC/XP sent the following message to HQ USAF/SCP/SCM/DA concerning electronic mail policy:

> As a result of the evolution of small computers and their increased connectivity to various networks, an Air Force-wide policy for using electronic mail for official correspondence would be helpful. Please advise of any efforts you may have to develop policy/procedures for using electronic mail for official correspondence. (16)

Additional inquiries were sent until a response was finally received in April 1987 from the Office of the Secretary of the Air Force (OSAF/AADQ/AADX). Pertinent quotes of the response follow:

> Electronic mail is considered official mail. All electronic communications are official in nature. We divide communications into two categories: formal and informal. These definitions will be specifically addressed when guidance is added to AFR 10-1.

> Electronic mail is not to be treated as an extension to AUTODIN traffic.
>
> SAF/AADX and SAF/AADQ are working jointly with HQ USAF/SC to develop Air Force policy on electronic mail. This policy will become effective when it is incorporated into AFR 10-1 in the near future. (2)

It has been nearly a year since that message was sent and AFR 10-1 change is still a draft.

Generally speaking, electronic mail is a novelty within the Air Force. Many people perceive that electronic mail users must be computer wizards. In fact, it is often viewed by management that anyone sitting in front of a microcomputer as playing with a toy. As shown earlier in this paper, most large corporations recognize the advantage of computer literacy even to the point of providing the executive a microcomputer to use at home--a small investment for increased productivity. Many Air Force managers of today did not grow up in a computer environment and have not readily accepted the computer as an office tool such as a typewriter. Many cannot visualize a system that combines many of the features of the telephone, typewriter, secretary, base mail system, and the obvious capabilities of a computer into a relative inexpensive microcomputer that only takes up about four square feet of desk space.

Electronic mail is being used in many areas within the Air Force today. Public affairs offices coordinate

daily on news events and unit public releases. Prospective stories are composed, transmitted to electronic mailboxes, reviewed, edited if necessary, and returned in much less time than it would take using conventional mail. Unit safety offices are using electronic mail to coordinate and distribute unclassified safety information directly from the office. Monthly Ground Mishap and Safety Education Summaries are being upchanneled via electronic mail. (17) MWR organizations are using electronic mail to transmit recurring reports to higher headquarters. Personnel and finance offices have been transmitting information via computers and phone lines for years but no one called it electronic mail.

Electronic mail is being used in the Air Force by a few organizations to exchange information. And, the use of electronic mail in increasing. However, it seems that a few people are using it more, not more people using it a little. Should the Air Force place more emphasis on updating the office and utilizing the technology that is modernizing the corporate world? Will electronic mail enable the Air Force to have a paperless office in the future?

## Benefits

Many corporations have as their goal a paperless office. While a paperless Air Force does generate some

interesting thoughts, this paper does not intend to suggest that this is in the foreseeable future. Formal record communications such as AUTODIN that guarantee timely delivery of secure message traffic will be needed for some time. (18)

Using electronic mail for unclassified information processing presents many opportunities for modernizing the way the Air Force conducts its day-to-day business. Sending correspondence by electronic mail is much faster than using the traditional mail system. There is no waiting for the scheduled base distribution pickup and a typical two to four day delivery time. And once the piece of mail reaches its destination, it often takes another day or two to reach the individual for whom it is intended. If the correspondence requires a response, then the process is reversed. It is not unreasonable to expect a ten day transit time for a simple two-way communication process. Had this same process been accomplished by electronic mail, it could have been completed over night or possibly even the same day. Once transmitted, the electronic message is in the recipient's electronic mailbox within seconds. Electronic mail can also be sent to multiple addressees with the same efficiency and speed. The only delay in receipt is the interval between mailbox checks by the users. The electronic message is then read, downloaded if

a hardcopy is desired, filed appropriately, and answered electronically.

Electronic mail is equally advantageous when compared to AUTODIN. While AUTODIN is faster than regular mail, the speed advantage is primarily in the transmission time and is dependent on the assigned priority. The message must still be physically handled by several people at both the sender's location and the recipient's. Using electronic mail for unclassified correspondence will take a significant workload off of AUTODIN. (18)

Electronic mail can eliminate telephone tag and reduce some of the load on the AUTOVON system. (18) In addition to the frustrations of trying to get an AUTOVON line to make a call, the other party is often not available so a message is left for him to return the call. Chances are equally as good that when the call is returned, the originating party is not available either and now another message is left. This process could take several hours before the two parties get together. After the call is successfully completed, the parties must rely on memory or notes as to what was discussed.

Electronic mail is person oriented rather than location oriented. Communication is sent to an individual, not to a place where that individual is supposed to be. Electronic mail users can read mail sent to their

electronic mailbox independent of their physical locations. This also cuts down on the vast amount of time wasted by secretaries and executives chasing each other around to pass on a simple message. (5:54) Electronic mail gives executives the ability to integrate communications into their own workday. Coast-to-coast communications can occur regardless of time zone differences or conflicts in schedules. (7:31) Command structures of Air Force organizations may span many time zones. Direct telephone contact between individuals is often limited to three or four hours per day unless adjustments to the workday are made. Telephone communications between CONUS and PACAF or USAFE are often time consuming to originate and of poor quality when connected. (18)

The convenience of using electronic mail should increase the flow of information to the appropriate decision makers and improve the quality of staff work. One way information flow can be sent to several people with one transmission instead of several telephone calls, and each person gets the identical message. Material requiring coordination can be sent to each office at the same time with equal suspense dates. The probability of the material being misrouted or lost is eliminated and action can be completed much faster. (18)

## Limitations

Users of electronic mail must have access to a terminal, preferably immediate access. (4:84) Many of the advantages of electronic mail will not be realized if users have to leave their desk to access the system. There is a perception by many in the Air Force that computers are toys. There has not been wide acceptance of the utility of unit commanders and key supervisory staff having computers on their desks.

"Electronic mail systems still require learning certain computer skills." (4:84) For some it seems easier to scribble something down and give it to someone else to type and process. While most of the software minimizes the need for computer expertise, messages still must be typed on a keyboard before they can be transmitted. Executives that are unable to type will be limited in their ability to utilize the capabilities of electronic mail.

While the system will put mail in users mailboxes within seconds, nothing is gained until the user checks his mailbox. Effective use of electronic mail assumes that users check their mailbox frequently. (6:27) While there are commercial programs available that can tell the originator of electronic mail if his message has been received and even read by the recipient, the mail programs available on DDN do not have that capability. The system

cannot confirm that the message has been received (even in the recipient's mailbox) or even guarantee that the message went beyond the local DDN gateway. Many users in the Pentagon had a problem recently when a one-week outage brought down the DDN gateway with no visual indication to the users that anything was wrong. They kept sending electronic mail to subscribers on DDN, but the local gateway was not putting them on the network. (14) This lack of feedback to the sender is the most significant limitation of DDN.

Electronic mail is in competition with more traditional means of communications. There is often a reluctance to change to a new technology. It is difficult to leave something that is comfortable for something that is unfamiliar. Many corporations found that once executives had the opportunity to use electronic mail, this limitation was overcome. (12:56)

The major non-technical limitation in the Air Force is the lack of a definitive policy on the use of electronic mail. Without such a policy, their is no obligation for a commitment from Air Force leadership to require, or even encourage, the use of electronic mail in conducting day-to-day business.

## CHAPTER VI

## RECOMMENDATIONS AND CONCLUSIONS

There has been little progress within the Air Force toward implementing an effective policy on electronic mail. There has been much concern over definitions and formatting. The intent of this paper is not to define specific details such as formatting the electronic mail messages; however, solving the issues of officiality and formality are important steps toward defining policy.

Is electronic mail official, unofficial, both, or neither? This question should be considered resolved with the OSAF/AADQ/AADX 091408Z APR 87 message that stated: "Electronic mail is considered official mail." (2) Official, as it is used here, should be only taken to mean "not for personal use", rather than an all-inclusive "category" of mail that requires specific handling or filing.

There has long been a perception that formal record communications are limited to only those communication means that provide hard-copy output such as AUTODIN. (1;15) This has perpetuated "a mind set for many that unless message traffic is in AUTODIN format and goes through the message center it cannot be formal traffic." (19) The proposed draft to AFR 10-1, Chap 8,

Electronic Mail, departs from this notion and acknowledges that electronic mail has both formal and informal applications: "Formal communications consist of official correspondence, memorandum, and other communications transmitted in place of types of written communications found in AFR 10-1 and AFP 13-2." (20) Formal electronic mail would include letters, staff coordination, reports, and exercise/operational tasking. Guidelines for informal communications are left to the users. (20) Informal electronic mail would include notes, memos, and scheduling information pertaining to meetings and conferences.

Air Force policy should recognize that the use of electronic mail is a legitimate method of conducting official business within and between Air Force organizations. It is not a replacement for other traditional means of communications but should be considered complementary to them. (5:57)

A second policy item should be to encourage the use of electronic mail for both formal and informal communications to the maximum extent practical. Increased utilization of electronic mail will reduce the workload on the AUTOVON and AUTODIN systems. (18)

Thirdly, Air Force policy should require commanders to take necessary procurement/programming action to develop capability to utilize electronic mail. The policy should

loosely describe what the desired system capabilities are and provide general guidelines on user responsibilities and requirements to achieve these capabilities. The Air Force electronic mail network should support local communications (intra-base) and long-distance communications (inter-base). This can be achieved by having a local area network (LAN) with gateway capability to the Defense Data Network (DDN). Each base would have a host computer that would allow for on base traffic to pass over the LANs and inter-base traffic over the DDN. (19) There may be several LANs on one base. In addition to supporting inter-office communications, each LAN would have a bulletin board area where users could check meeting schedules, daily flying schedules and other general interest items. The LAN should provide both executive mailboxes and organizational mailboxes. Executive mailboxes would provide commanders and senior executives the capability to send/receive private mail that is often a part of their normal business. Organizational/office mailboxes would provide the capability to send mail to anyone in a particular office. Access to electronic mailboxes should be controlled through the use of passwords to ensure security and privacy. These passwords should be changed frequently to minimize compromise. Password complexity could vary with the degree of confidentiality desired.

The DDN provides the long-haul capability for inter-base communications. To support an effective network, Air Force policy should require every organization to maintain a mailbox on the system, preferably one for each major functional area within the organization. Access to the DDN requires official authorization and regular usage. Mailbox security is provided through the use of passwords and user identification numbers and access codes that are assigned by a DDN Host Administrator. Users can change passwords later and should do so regularly. (8:6.9)

The frustration of not knowing if mail is reaching the recipient must be resolved. The electronic mail programs available on DDN must be updated to include the capability to indicate that the message has been received into the recipient's mailbox and whether or not it has been read. Equally important is the user's responsibility to develop regular habits of checking for mail. Elimination of mailbox lag will encourage more people to use the system and will result in a more effective electronic mail network.

In summary, the Air Force should establish a policy that:

a. Recognizes electronic mail as a legitimate way of conducting official business within and between Air Force organizations.

b. Encourages the use of electronic mail for all unclassified administrative correspondence including both formal and informal communications to the maximum extent practical.

c. Requires commanders to develop the capability and begin incorporating electronic mail in their day-to-day business. DDN access should be the first step.

d. Provides general guidelines for a typical configuration. A recommended configuration would be for the office personal computers to be connected to a LAN with gateways to other LANs on base and the DDN. Initially the office computers would probably connect to the DDN through dial-up modems. Then, depending on physical layout and availability of funds, either a dial-up or hard-wired LAN should be installed. While a dial-up LAN may be more appropriate for some existing facilities, consideration should be given to pre-wiring for a hard-wired system when designing new construction. A dial-up LAN does compete with other office telephone requirements.

The goal of electronic mail in the Air Force is not to create a paperless office, but rather to streamline the administrative process and enhance the flow of information between people. Implementation of the above policy recommendations would be a positive step in that direction.

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