

THE AUTOMATED OFFICE: PART 2

If you are operating in the typical office environment, where voice telephone calls, paper letters and files, and face-to-face meetings are the communication modes, and you want to move to a more automated environment (where computer-based work stations and electronic communications are used) how would you do it? It appears that all companies will face this question sooner or later. We do not purport to know *the* answer, but in this report we present some of the current thinking on the subject of planning for the office of the future. We begin by describing the progress of two organizations that are well along in implementing their automated offices. One has chosen to use available outside services, the other has chosen to develop its own system with the help of vendors.

The U.S. Army Materiel Development and Readiness Command (DARCOM) is located in Alexandria, Virginia. It is responsible for developing and purchasing Army weapon systems, and for providing the logistic support for the use of these systems. The command employs 106,000 people who work in over 100 locations, from White Sands, New Mexico, to Fort Monmouth, New Jersey. The total command budget is \$13 billion a year, of which \$120 million is spent on business data processing. DARCOM has 83 data processing installations, 30 of which are major ones, spread across the United States.

In 1974 the data processing director became aware of the ARPA Net and the diversity of tools being developed on it. He had the situation investigated to see if such tools could be useful in a non-research environment. After assessing that some of the tools on the net would be useful, he had seven ARPA Net 'mail boxes' acquired; we

discussed this type of 'electronic mail' last month. These 'mail boxes' were acquired for himself, for his deputy director, for three division chiefs on the data processing staff, and for the two heads of systems development (one located in St. Louis, Missouri, and the other located in Chambersburg, Pennsylvania). The purpose of this acquisition was to perform a one-year experiment to see whether the use of the net would enhance their work habits.

The tools they use on ARPA Net are MSG and Hermes for message distribution and file management, SPELL for correcting spelling errors, XED for text editing, and more recently, NLS for document preparation. For the public availability of these products see Reference 1. Most users use terminals operating at 300 bits per second. At this speed, output is generally printed on paper (and discarded after use), because users do not want to sit and wait as the CRT displays

their messages at this slow rate. With the increasing reliance on NLS and 1200 bps lines, use of the CRT for display output is becoming more common.

NLS users also have the option of two other types of inputting devices. One is a desk-top control for moving a CRT screen cursor; the cursor moves as the user pushes the device, called a mouse, around on the desk top. The other input device is a five-key keyboard for entering single-letter commands. The users have found that with one device in each hand they can easily browse through files and edit textual information, without the use of the regular keyboard.

The seven initial users soon found that the system did indeed change their communication habits. The basic change that these people have seen is that their communication with one another has increased *dramatically*. They no longer have the problem of getting together at one place for meetings. They reach each other through electronic messages. Most of them check their message files two or three times a day. And they say they are very attentive to the messages at these times, because they choose the time when they will not be interrupted by other matters.

The director found that he could easily keep his deputy informed, by 'carboning' him on messages sent. This had been a major problem for him in the past. The director also found that use of the system affected his travel habits. Where previously he had visited the remote system development sites once a month, he now needs to visit them only once every six months. Thus, a number of his duties are now performed in a different manner; electronic correspondence is used in place of some face-to-face meetings and voice telephone calls.

As Uhlig (Reference 2b) points out, early in 1975 (six months after the experiment began) the advantages of the system were so clear that 20 additional data processing managers at various DARCOM sites acquired ARPA Net 'mail boxes'. And in late 1975, still more 'mail boxes' were acquired for other users within DARCOM.

The data processing department offers the ARPA Net usage as a data processing service by providing the necessary 'mail boxes' and access points to the net. The service is provided at a flat rate on an annual basis, regardless of the volume of usage. This permits users to send as many

messages as they wish, without worrying about per-message costs.

The experience at DARCOM has been that communities of users, rather than individuals, subscribe to the service. A subset of the command, say, becomes interested. They often exchange information amongst themselves and find the service useful for these exchanges. Through them, others within the command are drawn into usage. The data processing division does not go out and 'sell' the service. Others have heard about their use and have asked them about it. Thus, knowledge of the service has been by word-of-mouth, not by salesmanship. For example, the test and evaluation command, with proving grounds as far apart as Alaska and the Panama Canal Zone (which are separated by five time zones), acquired 'mailboxes' on ARPA Net. They are very pleased with the service because they now get two message exchanges each working day between these sites. Before, they were lucky to get one.

The use of the ARPA Net service has continued to grow within DARCOM. Currently the command has over 120 ARPA Net 'mailboxes.' With an average of three users per box, that makes more than 360 people on the address list within DARCOM. We were told that one-third of these people interact with others directly, the rest go through their secretaries.

At DARCOM the problems that they have had with the system itself have been in getting access to ARPA Net. Obtaining access points to the net is difficult, because the user community is growing so rapidly. In order to provide good response time to users, the number of 'mailboxes' is currently restricted. Another problem has been that some people have a cultural stigma against typing. This is a formidable problem, the people at DARCOM tell us, and it may not be solved with this generation of users.

At DARCOM they are very satisfied with their experimental service approach to introducing the automated office. Using the higher speed lines, NLS, and a CRT terminal, one person told us that he feels that his productivity has increased four-fold. And we get the impression that others are as pleased with the effect of this aspect of the automated office environment on their work productivity.

Citibank, N.A.

Citibank, N.A. is the banking subsidiary of Citicorp, a bank holding company. In addition to commercial banking, Citicorp provides mortgage banking, consumer finance, equipment leasing, travel services, merchant banking and other services. With assets of \$77 billion, Citicorp is ranked as the second largest commercial banking company by *Fortune* magazine.

Citibank has headquarters in New York City. It is organized into seven groups: national banking, international banking, consumer services, investment management, merchant banking, world corporation, and services management. The services management group (SMG) provides processing and customer services for the bank's domestic and multi-national corporate customers, develops and markets new corporate services, and provides administrative support to the bank related to accounting, management information, EDP technology for system development, and world-wide communications.

In late 1975, two separate automated office studies were initiated within SMG. The manager of the advanced technology office (ATO) department decided to broaden his team's horizon. Previously, this department had been an internal consulting group for assisting other departments to install word processing. In 1975 they began to look at how word processing and other technologies could be applied to aid management. Simultaneously, the group vice president became interested in the automated office field, with a view toward implementing some of the new technologies within SMG. In 1976 the two efforts were merged within the ATO department.

In 1976 the ATO team began its study by trying to understand the nature of managerial work. Since managers mainly do not produce measurable items, it was decided that span of control could be used as a measuring standard. By noting the change in the number of people and projects handled by each manager, the impact, benefits and costs of implementing the automated office could be better determined. In 1976 Citibank had 40,000 front line service employees and 8,000 managers. Their goal is to allow the size of the front line service staff to grow without increasing the number of managers, thus increasing management's span of control. They

believe this can happen only if management becomes more productive.

In order to see what types of work their managers did, the team performed a management activity study. They kept diaries of the activities performed by 120 managers. From this study they discovered that managerial activities differed only slightly depending on job types. And they were able to identify some trends that would influence their future communication needs. Some groups, for example, have a great deal of contact with customers, while others hold many internal meetings. Managers within the international banking group travel a lot. And the telephone usage and flow of internal and external mail differ within the various groups. From this study it was determined that Citicorp would need a new communication network in order to allow the diverse needs of these various groups to be met.

The first generation system. The first step toward implementing the corporate network was the installation of sixteen prototype systems. These systems are stand-alone units, each shared between a manager and a secretary. They are linked using 1200 bps dial-up lines with each system automatically sending and receiving messages. Each system consists of a 24-line CRT display terminal in the manager's office, and a similar display unit, an impact printer, a floppy disk unit, and a PDP-8 mini-computer in the secretary's office. A shared system was given to the group and division heads within SMG.

The software for the system was written by Citibank. The system provides word processing, message distribution and filing capabilities. It also supports on-line calendars and follow-up lists. And the system supports an interface to three MIS services for querying Citibank files in their budget and project status tracking systems. The budget link was made at an early stage to show that information could be made more available to management, and thus the budget review process would take less time. The manager need only type in the system name to gain access. The system dials the service and obtains access to the budget file. Message distribution is done similarly. The addressee's name is entered and the system dials that person's telephone number and sends the message.

How did the users react to this system? Well, initially the secretaries were not anxious to use it. But they soon became strong supporters of it, and within four weeks they were very accomplished in its use. Many of the sixteen managers did not want to type, and therefore they actually use the system themselves only for maintaining their appointments calendars. Several managers are active users, using the word processing capabilities to create and send messages and query company files. The managers said they would prefer having function buttons and a full page screen display.

The second generation system. Using the knowledge gained from their use of the first generation work stations, late this year Citibank is installing its 'second generation' of systems in 15 offices of one of the banking groups. These are turnkey systems using full-screen CRT displays. The system equipment is built into office furniture, with considerable care given to dampening the system's noise and heat and hiding the numerous cables.

Since the first and second generation systems are not compatible, a company standard communication protocol has been written to allow users of both types of systems to communicate with one another. And several new features have been developed: a format control language, the ability to annotate electronic documents, and a BASIC interpreter for local programming. All information is stored in the management work station as 'active' information. In the future archival information will be moved to a cheaper storage medium.

Citibank expects this system to be more widely used for several reasons. First, the managers in this group are located at four sites within New York City. Previously, urgent messages were sent by private messenger service among these locations. Using the work stations, such messages can now be sent electronically. Secondly, this new community of users is more vertically aligned within the organization, and so more communications take place within it. And third, the systems have been designed more with people in mind, the project manager told us.

In addition to their work station development, Citibank has been trying in other technologies. In

1977 they acquired an OCR machine for inputting internally typed documents into the system. Documents typed on standard typewriters equipped with the OCR-readable font can thus be input into the system for electronic storage, updating and distribution. Also they have acquired a projector that enlarges a CRT display and projects it onto a large screen for use in meeting rooms. For the future they are looking at interfaces to photocomposition equipment and digital telephones.

Problems with use. Citibank has found that many of its managers do not want to use a computerized system unless its use is very easy to learn and remember. They prefer function keys to typing in commands. And they want to see full pages of text at one time on a display. Citibank has also found that the appearance of the system is important. Thus, the second generation system has the decor of office furniture, with low noise and heat output.

Citibank has found that although there is a lot of technology available in the marketplace, it has not been packaged to meet their needs. Thus, they are working with vendors to create compatible and usable prototype systems. And they are installing these slowly and carefully within various user communities within their corporation.

GETTING TO THE AUTOMATED OFFICE

As we mentioned at the beginning of this report, no one yet purports to know how to implement the automated office. What we have done, however, is to talk to a number of users to discover the approaches they are taking. The remainder of this report draws heavily on these user discussions, as well as on discussions with James Carlisle, a well-known consultant in the field. Based on his experiences, he gave us an outline of the various considerations that an automated office planning team should include in its efforts. We also reviewed numerous articles and papers on the subject, and we have compiled a bibliography of these (Reference 9).

The approach to be discussed makes two assumptions. One is that the planning study begins with a look at the total corporate information picture. The automated office is an integrated

communication network; without a *corporate* strategic plan, the benefits that we discussed last month may not be realized. The second assumption is that leadership of the project must come from top management. This emphasis also is to better insure an integrated system. Here then is an approach to implementing the automated office.

Obtain top management commitment

A number of speakers at the automated office seminars we attended (Reference 4) pointed out that the key to future business success will be *information*. It is becoming *the* critical resource, they say. So top management must be made aware of the need to formulate a *corporate information policy*. We see the automated office as part of this total information picture. It is not an end in itself; rather it is an approach to managing information that takes advantage of technology.

To obtain top management involvement, Carlisle recommends using a 'two-tiered' approach. The top tier is the top management steering committee for the automated office, consisting of senior functional executives (generally, vice presidents). The function of this committee is analogous to the data processing steering committee—making budget decisions, setting project directions and priorities, reviewing progress, etc.

The second tier is the automated office project team, led by an 'information' manager. This team conducts feasibility studies, presents proposals to the steering committee, and manages the overall automated office project. Since the term 'information resources' cuts across several existing corporate functions—such as data processing, administrative support, and telecommunications—the planning team should include representatives from all of these functions. The planning teams that we encountered in our research are taking this approach, since it establishes a central control point for creating and maintaining the various automated office projects, as well as central control for the corporate information plan. In the future, some people predict that this team will evolve into an information department, with a high level executive at its head.

Carlisle points out that both tiers are necessary to properly evaluate the benefits from office technology projects and then achieve them.

At the outset, what key issues should be presented to top management to obtain their commitment for proceeding to create a corporate information policy? We have heard of three: (1) emphasize the value of information, (2) point out the large costs of the office, and (3) focus on improving productivity in the office.

The value of information. Users now investigating the field tell us that competition is forcing a speedup in the flow of information, and that they must make appropriate speedups to compete effectively. They do not see their current office environment providing this necessary increase, so they are looking for an improved method of handling corporate information. In the typical office environment, managers receive an avalanche of unstructured communications. They have no quick method of querying corporate files or moving information to other people. An integrated communication network will solve these problems, say automated office proponents.

The cost of the office. A second selling point is the need to control the large, often hidden, costs of the office. Some authors note that office costs are often 50% of corporate costs. Yet, we gather, few companies really know how these costs are allocated, so they cannot control them.

The people at Exxon Corporation have been investigating their office costs. In a paper included in Reference 4b, they present an outline for computing the cost of business communications. They classify these costs into seven functions: creation, capture, keyboarding, distribution, expansion, storage and retrieval, and disposal. Their cost estimates for each function are based on: numbers and kinds of personnel, compensation rates, estimated lines of text produced by secretaries and professionals, and estimated time allocations.

This approach to making gross estimates of office cost components appears to be needed to make top management aware of the magnitude of information resources currently being used in the company.

Productivity of office workers. The third point for selling the office of the future to top management is the current low productivity of office

workers. Some authors estimate that office worker productivity has increased only a few percent in the last four years. In contrast, the professionals and secretaries that we talked with who work in an automated office environment tell us that their productivity has increased dramatically, in the hundreds of percent. The reasons given for these increases are: (1) keeping information in electronic form, where it is easily accessed and manipulated, and (2) having the ability to contact other people more easily.

These then are the three key selling points for directing top management's attention to the automated office and to creating a corporate information policy.

Involve one top level productive person

It is important that the project have the respect and support of top management. One way to accomplish this is to find an interested senior 'productive' executive—one who is clearly 'earning money for the company'—and obtain his involvement. Such a person has the respect of top management and is well aware of corporate objectives. This combination makes this person an ideal advocate for the project, says Carlisle.

The automated office project will require top management approval of large, possibly speculative, investments in office equipment. Management is more likely to approve such expenditures with a person they respect on the project. Additionally, this person can better insure that the emphasis of the project is in line with company objectives.

This executive will become the 'change pusher,' so it helps for him to have a lot of influence with people lower in the organization. If he is an initial user of a computer message system, say, others will more likely use the system, seeing that this is a tool through which they can reach him more easily.

So the early introduction of a high level advocate on the project is important for gaining top management support, for keeping the project in line with company goals, and for getting others to use the system more readily. The choice of this executive should also fit in with the choice of the initial user group.

Choose an initial user community

In order to make the automated office project more likely to succeed, the choice of the initial user community is important. This group should be one where a pilot project is most likely to show an improvement in its operation. This improvement should come through the introduction of new tools only, not new procedures, organizational or personnel changes, and so on. Initially, emphasis should be placed on creating benefits that are related to productivity, says Carlisle. These should be measurable and easily achievable. Cost savings may only come through improvements in procedures and organization, but they should come later, after the new systems have been accepted and are in frequent use.

What kind of user group is most likely to assure a successful pilot project? Well, from our talks with users, we have come up with the following criteria.

A user community. The first users should be a community, in that they communicate a lot amongst themselves in order to do their work. It is the importance of the communications among the members that matters, not whether these internal communications represent the largest percentage of their communications. The convenience of using a computer message system can dramatically affect the informal as well as the formal communications within such a community. It would have much less impact for employees who deal mainly with uncontrollable external correspondence. Carlisle notes that identifying these 'communication communities' is more of an art than a science.

Enthusiastic managers. Although the automated office can provide benefits to managers whose secretaries use the system for them, it is best to select managers who will use the system themselves in a pilot project. Electronic communication requires some changes in working habits, such as substituting typing for telephone conversations. So these managers should be enthusiastic experimenters. More will be gained for future implementations if these managers can provide hands-on evaluations.

Geographically dispersed. Mintzberg (Reference 5), in his study on managerial work, states that the employees who are best informed are

those within walking distance of their managers' offices. The next best informed are a routine telephone call away. The least informed about current company and departmental issues are those further away still. Users of computer message systems find that this geographical barrier disappears with the use of electronic communication. One message can be broadcast to all pertinent people, keeping them all equally informed (as well as maintaining a record of the information).

We believe that the most dramatic organizational improvement will show up among enthusiastic managers who need to communicate with each other a lot but who are geographically dispersed. A user community with these attributes would be most likely to have a successful pilot project.

Create a corporate information plan

The corporate information plan for the office should include: the context, the goals, the strategy to reach the goals, and the migration plan.

The context

According to the dictionary, the word 'context' means "the whole situation, background or environment relevant to some happening." Carlisle stressed to us that one of the first tasks of the planning team should be 'to create a context,' i.e., to create an atmosphere of success for the automated office. This positive environment is needed to reduce the 'upheaval' factor during implementation. The context should influence the other items in the information plan, he says.

For example, in one company, says Carlisle, the feasibility study that was made in three departments concentrated on management and communication activities, as well as on attitudes toward change, and without mentioning office automation *per se*. Top and middle level managers were able to identify 32 potential cost-effective project areas. This study was followed by a ten-day observation study of manager/secretary teams, to discover which of the projects had the most promise. By the time the study results were made known, a number of the managers had indicated that they wanted to be involved in the pilot projects. This enthusiasm justified a portfolio

of projects, plus the formation of an office automation function and the creation of a steering committee.

As this example illustrates, the context that is most conducive to success seems to be an environment where the employees are part of the project, and where they have a stake in its success. In order to create a positive context, the planning team must discover what types of organizational improvement would stimulate employee participation, and use these to formulate the goals, says Carlisle.

The goals

The goal of the automated office should be improved organizational efficiency and better information handling. But this can be achieved in numerous ways, some that support corporate priorities and mode of business and some that do not. So a key question in determining the specific goals of automating the office is: Do the expected payoffs support the corporate needs?

For example, as Scala (Reference 6a) describes, at Citibank each line manager had only part of the responsibility for a process, such as a loan. Under their reorganization, processing lines devoted to specific services have been created. A customer can now deal with just one person, say, for a loan, and that person has full responsibility for processing the loan. He does not pass it off to someone else in the bank. This reorganization has changed job descriptions for clerks as well as line managers. The electronic environment provides the information accessibility for employees to perform broader decision making functions than were possible before. This reorganization supports the corporate goal of more personalized service.

If the automated office is designed to support corporate objectives, then whether it is used or not depends on how well it has been designed for easy and convenient use by the employees. So an initial statement of goals better insures that the team is designing the 'right' system.

The strategy

According to White (Reference 2c), the plan, or strategy, for getting to the automated office should include five types of considerations: organizational, processing, communications, people, and environmental.

Organizational considerations deal with the effect that the automated office will have on organizational structure and procedures. A major question to ask is: Will automating the office cause us to restructure our organization? The answer may very well be Yes, because work stations will allow companies to handle information in a different, more efficient manner.

For example, if communicating via terminals replaces a portion of business travel and meetings, it could also begin to replace some commuting. What will be the organizational effect of this? How will departments then be structured? Based on studies within organizations that were already in a relatively automated environment, Carlisle says that significant changes occur in the '9 to 5' work day, the five-day work week, the nature of supervision, and the basis of compensation. Office work is becoming task-oriented instead of hours-oriented.

So besides companies *wanting* to change their office structure to take advantage of the technology, they may also be *forced* to reorganize because of changing work patterns and norms.

Processing considerations include all of the typical data processing questions. What applications should we implement and in what order? What kinds of equipment should we use? How do we get outside communications, such as letters, into our automated system? How should we file these huge amounts of information? Such questions should be answered with the help of the data processing department, obviously.

Communications considerations include both the internal company communication system as well as its links to the outside world. Since communications form the basis for the automated office, the strategic plan for the corporate information network is extremely important.

We see communication considerations falling into two areas. First is the need to make provisions for wiring for eventual broadband service. Wiring offices to connect to the in-house system is no small problem in itself. At Citibank, in their first generation system, they found they had an abundance of wires and cables within their offices. Wright (Reference 6b) sees the future solution being a broadband communication cable that serves an entire building. Terminals on any desk in the building would be able to access the

system by wall sockets. Broadband communications allow voice, data, graphics, pictures and words to travel over the same links. The controller for such an in-house system could be a computer private branch exchange (CBX). These computerized in-house exchanges will provide a good point of contact to the outside world.

The second communication question concerns linking to the outside world: which public network offerings do we want to use and what will our local loop requirements be for connecting to these? One proposal is to avoid the local loop entirely by beaming communications between rooftop dish antennae via satellites. Dick (Reference 2d) discusses Satellite Business Systems and the integrated communication services they will be offering in 1981 using satellites. Another approach would be to use public packet data networks, which we discussed three months ago.

People considerations deal with the behavioral impact of the automated office. A major lesson learned from the installation of word processing equipment is that an effective marketing strategy is needed to persuade office workers to change the way they work. The human factors questions dictate how quickly word processing (and now the automated office) will be accepted. People in the field feel that technology is the more easily solved area. Dealing with the human and organizational factors are much more difficult, they say.

Vendors are now trying to design work stations that people will want to use. We see this man-machine interface as an immediate problem for office planners, because managers may simply refuse to use a poorly designed terminal.

Several speakers at the seminars we attended voiced concern that data processing people would become enamored with solving the technical problems of automating the office and forget about the people problems. They stressed that considering the personnel aspects during the planning stage would do much to alleviate future implementation problems.

Environmental considerations include office lighting, furniture, the building structure, energy needs, etc. Like the people considerations, environmental considerations are often thought to be less important by technicians. However, when dealing with the office, the work environment

will have a great impact on how easily the automated office system will fit into the organization. So steps to prepare the office environment for automation should be made in the strategic plan; for a discussion see Morrison (Reference 2e).

The migration plan

The fourth element of the corporate information plan is the implementation program, i.e. the roadmap. This plan includes not only the steps for gradually increasing usage, but also the steps for increasing the system's capabilities.

As we have often urged in the past, we feel the safest manner to implement any type of advanced system is *the progressive approach*. In this approach, progress is made through a series of short (6 to 9 month) projects under the overall direction of a long range (5 year) plan. Each project is cost justified, uses only tested technology, and involves no pioneering use of vendor-supplied major software packages. These constraints are intended to provide a very high chance for success for each small project. And thus, once again, we recommend the progressive approach, this time for implementing the automated office.

The users we talked with have used this approach. They began with one small user community and offered only basic services that improve informal communication between people, such as word processing, message distribution, electronic file folder type storage, and calendars. These applications are now available on the marketplace, either as services or for use on in-house computers.

Once the total framework for the office information plan has been drafted, then the specifics to fill out the plan can be investigated.

Studies are needed

The plan for moving toward the automated office should be based on the results of several types of studies. These include: managers' work habits, current information flows, and the automated office marketplace.

Study the managerial work

In order to design a system to improve managerial productivity, the planning team needs to understand the managerial job in its company.

Specifically, the team needs to discover: the types of activities the managers perform, the amount of time they spend on each activity, the kinds of information they process, and the people with whom each manager communicates.

A lot of theories about managerial work have been proposed. We found one in particular, by Mintzberg (Reference 5), useful in assessing management's information needs. Based on his in-depth study of five managers for five weeks each, plus the work of other researchers, Mintzberg draws a number of general conclusions about managerial work. We shall mention a few of them here.

Mintzberg says that managerial jobs are remarkably alike, from the foreman up to the company president. They all perform ten basic roles and their jobs have six distinguishing characteristics. The differences between the jobs can be described in terms of these common roles and characteristics.

Mintzberg defines three of the roles as *inter-personal*, because they are derived from the manager's formal authority and status. One is the figurehead role, wherein he represents his organization in all matters of formality. Another is the liaison role, wherein he interacts with others to gain favors and information. And the third is the leader role, for the organization he manages.

These inter-personal roles allow each manager to be a nerve center for certain kinds of organizational information, which in turn leads to three *informational* roles. First, the manager acts as a monitor, receiving and collecting information so as to better understand the organization. The manager also acts as a disseminator, transmitting information to his organization. And the manager acts as a spokesman for disseminating information outside his organization.

These inter-personal and information roles, in turn, lead to four *decisional* roles. As an entrepreneur, the manager initiates change. As a disturbance handler, he takes charge when his organization is threatened. As a resource allocator, he decides where efforts will be expended. And as a negotiator, he deals with others on behalf of his organization.

In connection with the six distinguishing characteristics of managerial positions, Mintzberg says that managers (1) perform a great variety of activities with no obvious patterns—the trivial

are interspersed with the consequential. And they (2) work at an unremitting pace, spending only a short time on any one task. They have so many tasks to perform that they consciously avoid devoting too much time at any one time to any one activity. So managerial work is characterized by (3) brevity, variety and fragmentation.

(Mintzberg found the brevity of activities surprising. In his study, the average length of telephone calls was six minutes, unscheduled meetings averaged 12 minutes, scheduled meetings averaged 68 minutes, and desk work periods averaged 15 minutes. One half of the observed activities were completed in less than nine minutes.)

Continuing with the characteristics, managers are constantly being interrupted, by themselves and by others. They encourage such interruptions, says Mintzberg, because they (4) prefer live action. They want the most current information, so they (5) rely strongly on frequent, informal verbal conversations. These conversations give them quick feedback and 'hot' information. Mintzberg characterizes the manager's position as the neck of an hourglass, with information requests flowing to him from a wide variety of contacts. Much of the manager's power is derived from the information he possesses. He sifts this information and passes it along. Unfortunately he lacks a formal and efficient means of disseminating information. Finally, managers (6) maintain a complex network of contacts, certainly with superiors and subordinates but also with an often-underestimated variety of people outside their organizations.

Mintzberg reports that the managers spent 78% of their time and 67% of their activities on verbal communication. On the average 48% of this verbal contact was with subordinates, 7% was with superiors, and 44% was with outsiders (colleagues, fellow specialists, etc.).

We think these observations and the others presented by Mintzberg will be helpful in designing automated office systems, as well as choosing the initial user community.

The question is: How does a team find out what its company managers do? Do they act as Mintzberg suggests? Mintzberg describes seven methods for studying managerial work. These are: use of secondary sources, interviews and questionnaires, collection of critical incidents and

sequences of episodes, diary (kept by the manager), activity sampling, unstructured observation (diary kept by observer), and structured observation (diary plus predetermined activity categories kept by observer).

Carlisle performed a managerial study to determine the information needs of one user community. The study method and results are described in Reference 7. Based on this experience, he suggests beginning by studying one or two key people in the initial user community, using the structured observation method. In this method, an observer keeps a diary of all of the activities that the manager and his secretary perform for some period of time, say, one week. The information collected includes who participates in each activity, what the topics and purposes are, where the activities occur, and what communication media are involved. These activities are timed and later grouped. From this information, a fairly accurate model of the manager's responsibilities, time utilization, and communication patterns can be created. This model provides a 'snapshot' of the manager's work habits. (Mintzberg points out that most managers do not know how they spend their time. They think they know, but they will be surprised by the figures generated from such an observation study.)

Using the information from the study, the opportunities for improving the manager's effectiveness can be shown. And alternative automated office tools for achieving this improvement can be proposed. Carlisle feels that only one or two in-depth structured observation studies need to be performed, and by a trained management psychologist (not by a data processing systems analyst). From these the team can get a good feel for where managerial productivity can be enhanced. Then questionnaires for other managers can be developed, and activity sampling can be used. The important point, says Carlisle, is to spend the effort on the first one or two observation studies in order to develop pertinent questionnaires for accurately assessing other managers' needs. He says these first managers generally do not mind being observed, particularly if the study can lead to improving their effectiveness.

Study the current information flow

In order to determine a gross estimate of the

volume of business communications occurring in the office, random sampling can be used. We discussed this technique briefly in the March 1977 report on word processing.

In our research for that report, word processing supervisors told us that once a word processing center was set up, work that had not previously been performed by secretaries began appearing. This work came from employees who had not been receiving sufficient secretarial support in the traditional boss-secretary environment. We have heard that much the same effect occurs with the introduction of computer message systems. There is a larger increase in the number of communications (now in electronic form) than could be anticipated by simply extrapolating current volume. Unperformed or uncounted communications now become visible.

From the study of the current information flow, plus an estimate of the 'unperformed' or 'uncounted' communications, the team can draw up specifications for a prototype system that would meet their needs. With this in hand they can begin looking for a system.

Study the marketplace

We expect rapid changes in the entire automated office marketplace in the next ten years. So the planning team will have its hands full keeping track of the available offerings. The listing that we provided last month gives a fairly good view of the scope of this marketplace.

Introduce the new environment

The people at DARCOM, Citibank and ISI (which we discussed last month) gave us the same advice for introducing the automated office: *Introduce it on an experimental basis.* They were referring not only to the hardware and applications but also to the usage. Here are some suggestions they gave us.

As discussed above, the initial user community needs to be carefully chosen, to set an example of success and improved organizational efficiency. It is very difficult to foresee how employees will react to the new environment. So careful monitoring of initial enthusiastic users may help the team better design a system that unenthusiastic workers will use. Questions to be evaluated by the first users are: What is good and bad about the system? What payoffs does it offer? What

could be improved? What types of training will future users need? And what changes in work habits occur?

Also the initial applications should be chosen carefully to meet the users needs. Because of the available software, the companies we talked with implemented the basic word processing, message distribution and electronic file folder capabilities first.

With successful completion of the initial test, gradual expansion of the system can begin.

Expand the system

Following our recommendation of the progressive approach, we see expanding and enhancing the system as a series of small, cost effective steps. "Take it slowly," we were told. "Management wants the system introduced properly into user community. And management does not want to lock the company into the equipment by buying too much at one time."

Extend system usage. Extending system usage by small user communities allows the planning team to have enough resources to investigate the needs of each community and introduce changes more carefully. The automated office must be internally marketed to get it into use. Giving a trial period with a money-back guarantee is one approach. Giving the service away free for an introductory period is another approach. Encouraging maximum usage through a flat rate service charge is still another. Allow the users to experiment without obligation, we were told. These are all professional marketing approaches, and that is what it takes to introduce the automated office successfully.

Expect reluctant managers, we were warned. Many people have objections to performing a typing operation at a keyboard, for a variety of reasons. So the marketing should be aimed at both managers and secretaries. Introduce the system to secretaries first, because they are more likely to accept it. And have them trained by other secretaries. Then the managers can use the system themselves or through their secretaries.

Training needs to be both technical and 'environmental.' By environmental we mean the 'environment of interacting electronically.' Currently this is only available through typed messages. In the future, store and forward voice will

be available. As Uhlig (Reference 2b) points out, communicating electronically is an entirely new experience. He presents some interesting findings on how people react to this medium.

Just as people have had to learn the proper etiquette for telephone conversations, they will need to learn a new etiquette for written electronic conversations, says Uhlig. So some sort of discussion of interacting in this new environment should be included in the initial basic training. In the electronic environment both verbal and body language cues are lost. Unless the sender somehow indicates that a statement is, say, a joke, the receiver may interpret it incorrectly. And such misunderstandings can escalate into what could almost be termed 'fights.'

When people first use a message system, they are brutally candid, says Uhlig, because they have no fear of the receiver roaring back at them. Users also get the feeling they are having more interaction than they actually are. Electronic communication may be far superior for drafting reports, informal messages, and memos, but it lacks the forcing function of face-to-face meetings. Thus its use is inappropriate in some instances. So guidelines to help new users develop appropriate uses, message cues, and proper etiquette should be drawn up.

Active message system users very quickly want training on the more advanced features of the system, such as multiple indexing. Uhlig recommends anticipating this need and scheduling formal advanced training classes.

Increase system capabilities. Paralleling their extension of system usage, the companies we talked with are increasing system capabilities one at a time. For instance, one company has written macro commands for linking to existing data files. The macro commands are used to search, retrieve, and manipulate information by project or department.

The current notion of an automated office envisions numerous information services accessible from a work station. Corporate data bases, decision support systems, bibliographic search services, in-house printing, and public networks are examples of such services. If this is the corporate goal, then we see the progressive approach as being the most practical migration method.

The hardware also is increasing in capability.

Some users are now moving into their second generation of equipment, about two years after introducing their initial systems. The field is so new that planning teams must anticipate near-future equipment changes.

Conclusion

The progressive approach, then, is our recommendation for getting to the automated office. The people we talked with stressed that in order to be in the process of implementing an automated office system in five years, the corporate planning effort must begin now. To reiterate the cogent points of this approach: *the successful implementation of the automated office requires direction from the top of the corporation, with integration of data processing, telecommunications and administrative services views, and based upon a long-term corporate information policy. Implementation should be through short term, cost effective projects supported by a strong internal marketing effort.*

The evidence is clear: the automated office is beginning to appear. You will be hearing a lot more about it in the months ahead. And data processing management can play an important role in the successful introduction of this new technology.

REFERENCES

1. Services used by DARCOM that are available commercially include:
 - a. NLS, for document preparation, is offered by Tymshare, Inc., 20705 Valley Green Drive, Cupertino, Calif. 95014.
 - b. Hermes (for message distribution, file management, and text editing; it is an expanded version of MSG and includes XED) and SPELL (for correcting spelling errors) are offered by Bolt, Beranek and Newman, Inc., 50 Moulton Avenue, Cambridge, Mass. 02138.
2. *Datamation* (1801 S. La Cienega Blvd., Los Angeles, California 90035); price \$3.00 per issue:
 - a. Gilbert, John C., "Can today's MIS manager make the transition?" March 1978, pp. 141-151.
 - b. Uhlig, Ronald, "Human factors in computer message systems," May 1977, pp. 120-126.
 - c. White, Robert B., "A prototype for the automated office," April 1977, pp. 83-90.
 - d. Dick, George M., "SBS's celestial version of 'the system is the solution'," November 1977, pp. 141-158.
 - e. Morrison, Kenneth A., "How to plan space for people and computers," April 1978, pp. 163-176.

3. Carlisle, James H., "Evaluating the impact of office automation on top management communication," *Proceedings of 1976 National Computer Conference*, (AFIPS Press, 210 Summit Avenue, Montvale, New Jersey 07645), 1976, pp. 611-616; price \$50, microfiche \$15.
4. AIEE/MEC seminar notebooks (AIEE Seminars, P. O. Box 3727, Santa Monica, California 90403); price \$50 each:
 - a. The automated office, September 1977.
 - b. Automating business communications, January 1978.
5. Mintzberg, Henry, *The Nature of Managerial Work*, Harper and Row Inc. (10 East 53rd Street, New York, N.Y. 10022); 1973; price \$16.95.
6. *Administrative Management* (51 Madison Avenue, New York, N.Y. 10010); price \$1.50 per copy:
 - a. Scala, Bea, "Citicorp's view of 'paradise'," April 1977, pp. 26-29.
 - b. Wright, Norman T., "The management communication highway today and tomorrow," January 1977, pp. 26-27.
7. Carlisle, James H., "Benefits and problems in the use of computer message systems by management: Summary of results from an in-depth study of executive communications," 1976. Available as report RR-11-76 from Office of the Future, Inc. (7002 Boulevard East, Guttenberg, N.J. 07093); price \$5.95.
8. *Canadian Office* (2 Bloor Street West, Suite 2504, Toronto M4W 3E2, Canada); price \$2:
 - a. Carlisle, James H. "The future depends on administrative change," June 1978, pp. 21-22.
 - b. Carlisle, James H. "The journey to the office of the future," July 1978, pp. 30-32.
9. For a free bibliography of articles on the automated office, write EDP ANALYZER, 925 Anza Avenue, Vista, California 92083.

As these two issues on office automation have indicated, important changes are beginning to occur on the way that organizations use computer technology. We see some other, very important changes on the horizon, due to the rapid development of micro-computers. Next month, we will discuss our ideas on how the micros are likely to affect most computer-using organizations.

Prepared by:
Barbara C. McNurlin
EDP Analyzer Staff

EDP ANALYZER published monthly and Copyright© 1978 by Canning Publications, Inc., 925 Anza Avenue, Vista, Calif. 92083. All rights reserved. While the contents of each report are based on the best information available to us, we cannot guarantee them. This report may not be reproduced in whole or in part, including photocopy reproduction, without the written permission of the publisher. Richard G. Canning, Editor and Publisher. Subscription rates and back issue prices on last page. Please report non-receipt of an issue within one month of normal receiving date. Missing issues requested after this time will be supplied at regular rate.

SUBJECTS COVERED BY EDP ANALYZER IN PRIOR YEARS

1975 (Volume 13)

Number

1. Progress Toward International Data Networks
2. Soon: Public Packet Switched Networks
3. The Internal Auditor and the Computer
4. Improvements in Man/Machine Interfacing
5. "Are We Doing the Right Things?"
6. "Are We Doing Things Right?"
7. "Do We Have the Right Resources?"
8. The Benefits of Standard Practices
9. Progress Toward Easier Programming
10. The New Interactive Search Systems
11. The Debate on Information Privacy: Part 1
12. The Debate on Information Privacy: Part 2

1976 (Volume 14)

Number

1. Planning for Multi-national Data Processing
2. Staff Training on the Multi-national Scene
3. Professionalism: Coming or Not?
4. Integrity and Security of Personal Data
5. APL and Decision Support Systems
6. Distributed Data Systems
7. Network Structures for Distributed Systems
8. Bringing Women into Computing Management
9. Project Management Systems
10. Distributed Systems and the End User
11. Recovery in Data Base Systems
12. Toward the Better Management of Data

1977 (Volume 15)

Number

1. The Arrival of Common Systems
2. Word Processing: Part 1
3. Word Processing: Part 2
4. Computer Message Systems
5. Computer Services for Small Sites
6. The Importance of EDP Audit and Control
7. Getting the Requirements Right
8. Managing Staff Retention and Turnover
9. Making Use of Remote Computing Services
10. The Impact of Corporate EFT
11. Using Some New Programming Techniques
12. Progress in Project Management

1978 (Volume 16)

Number

1. Installing a Data Dictionary
2. Progress in Software Engineering: Part 1
3. Progress in Software Engineering: Part 2
4. The Debate on Trans-border Data Flows
5. Planning for DBMS Conversions
6. "Personal" Computers in Business
7. Planning to Use Public Packet Networks
8. The Challenges of Distributed Systems
9. The Automated Office: Part 1
10. The Automated Office: Part 2

(List of subjects prior to 1975 sent upon request)

PRICE SCHEDULE

The annual subscription price for EDP ANALYZER is \$48. The two year price is \$88 and the three year price is \$120; postpaid surface delivery to the U.S., Canada, and Mexico. (Optional air mail delivery to Canada and Mexico available at extra cost.)

Subscriptions to other countries are: One year \$60, two years, \$112, and three years \$156. These prices include AIR MAIL postage. All prices in U.S. dollars.

Attractive binders for holding 12 issues of EDP ANALYZER are available at \$6.25. Californians please add 38¢ sales tax.

Because of the continuing demand for back issues, all previous reports are available. Price: \$6 each (for U.S., Canada, and Mexico), and \$7 elsewhere; includes air mail postage.

Reduced rates are in effect for multiple subscriptions and for multiple copies of back issues. Please write for rates.

Subscription agency orders limited to single copy, one-, two-, and three-year subscriptions only.

Send your order and check to:
EDP ANALYZER
Subscription Office
925 Anza Avenue
Vista, California 92083
Phone: (714) 724-3233

Send editorial correspondence to:
EDP ANALYZER
Editorial Office
925 Anza Avenue
Vista, California 92083
Phone: (714) 724-5900

Name _____
Company _____
Address _____
City, State, ZIP Code _____