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CIVIL ENGINEERING WORK INFORMATION MANAGEMENT SYSTEM
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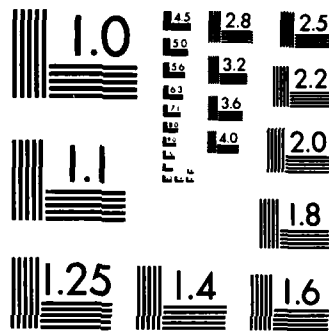
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WIMS



WORK INFORMATION MANAGEMENT SYSTEM

PLANNING GUIDE

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PLANNING GUIDE

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Submitted to the faculty in partial fulfillment of
requirements for graduation.

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) Over a four-year period beginning in 1985, the Air Force will purchase and install 130 Work Information Management System minicomputers at a cost of almost 100 million dollars. Currently there is no consolidated guidance available to help the Work Information Management System Project Managers install and implement the system at their bases. The Civil Engineering Work Information Management System (WIMS) Planning Guide fills that gap. This guide is designed to be used as a map to lead a base level civil engineering organization to the ultimate destination of an organization successfully using WIMS.					
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PREFACE

This Civil Engineering Work Information Management System (WIMS) Planning Guide is written for the WIMS Project Manager. Its purpose is to lead the Project Manager through the various phases required to prepare for the installation and operation of the WIMS minicomputer system. The author relied on personal experience and knowledge as well as the sources listed in the bibliography to produce this guide. However, it could not have been completed without the sincere interest and dedicated, professional help of several people from the Information Management Systems Office, Air Force Engineering and Services Center. Our purpose was to produce a simply worded, easily understood guide to be used as a map to lead a base level civil engineering organization to the ultimate destination of an organization successfully using WIMS. Hopefully we have done that.

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Chapter One

INTRODUCTION

WHAT IS WIMS?

The acronym WIMS stands for Work Information Management System. WIMS is a minicomputer system and associated user developed and vendor supplied software designed to automate the major functions of a base level civil engineering organization. It will enhance productivity, increase efficiency, and improve customer relations through better information management.

WHY DO WE NEED A WIMS PLANNING GUIDE?

By now you have heard about WIMS, the hardware (minicomputer), the user-developed software, and the scope and cost of the project. These things alone are enough to justify a guide to help ensure the successful implementation of this system. However, the real worth of WIMS is what it can do for your organization. To ensure WIMS gets off to a good start you need to plan for its installation well in advance of the critical event- arrival of the equipment. You need to know what to plan for, thus a WIMS Planning Guide!

THE TARGET AUDIENCE

The purpose of this guide is to lead you, the WIMS Project Manager, through the various phases required to prepare for the installation and operation of the WIMS minicomputer system. We assume you are a lieutenant with minimum Air Force and civil engineering experience. With that assumption in mind, we have tried not to use undefined acronyms and sketchy explanations. If we erred

and you are an experienced civil engineering officer, NCO or civilian employee, please remember our goal was to produce a simply worded, easy to understand guide that would aid you in the installation of WIMS, irrespective of your experience level. Hopefully we have done that.

HOW TO USE THIS GUIDE

We recommend you use this guide as a map to help you get from where you are now (an organization that will be receiving WIMS) to where you want to be (an organization successfully using WIMS). It is not directive, rather it is suggestive. It is not a checklist and should not be used as one. It is a planning guide to help you avoid possible pitfalls and to help you see the big picture. We have simply collected facts and expert opinions from various sources, consolidated them, and hopefully put them into a useful product. Send recommendations for improving this guide to the Air Force Engineering and Services Center, Information Management Systems Office (AFESC/AD), Tyndall Air Force Base, Florida, 32403 or call AUTOVON 970-6457. We wrote this guide for you and only you can tell us how we did. Let us hear from you.

office early can eliminate personnel problems later. As with the Civilian Personnel office, coordination with Data Automation is also required and important.

DATA AUTOMATION

The data automaters are usually the single managers of all data automation equipment. They will need to know what type and how many pieces of equipment you are getting. They will label each piece of equipment and keep an inventory. Let them know now that you are getting a minicomputer system and keep them in mind when you acquire additional equipment. Also Data Automation will be extracting Base Engineer Automated Management System (BEAMS) data for input into WIMS. WIMS will not replace BEAMS. WIMS will enhance the capability to use the information in the BEAMS data base. You should coordinate with Data Automation for the exchange of the BEAMS and WIMS tapes as soon as possible. See Figure 1 on page 17 for a sample letter you can use to alert Data Automation of your requirements. We recommend you hand carry the letter and get to know the folks in Data Automation. You will be seeing a lot of them during the hardware and software implementation phases. Develop a good working relationship with them. You should also foster a contact in Accounting and Finance.

ACCOUNTING AND FINANCE

Coordinate with the Base Accounting and Finance office for exchange of an Operating Budget Ledger and Allotment Ledger tape. Data Automation will also need to be in this loop. See Figure 2 on page 18 for a sample letter. You should hand carry this letter also. Dealing with people face to face is a personal touch that gets things done.

Chapter Four

EXTERNAL COORDINATION

MAJOR COMMAND

External coordination is essential for successful system implementation. Coordinating with agencies outside your organization will get your requirements known and will also provide a learning opportunity for you. Your major command counterparts have already experienced the agony of defeat (really only minor setbacks) and the thrill of victory associated with the installation of a system much like yours. They started with much less information available, learned by doing, and gathered a wealth of practical knowledge that can benefit you. Talk to them on the phone and go visit them. Listen to them, they are a valuable source of practical experience. In addition to coordinating with your major command, some local organizations you will need to touch base with are Civilian Personnel, Data Automation, and Accounting and Finance.

CIVILIAN PERSONNEL

Inform the Civilian Personnel office about the installation of your system. Those civilian personnel in your organization who are going to be intimately involved with administering the system, may require position description changes. Position description changes are the supervisors responsibility. However, significant changes may require the Civilian Personnel office to reclassify the position. The creation of completely new position descriptions will certainly require the assistance of your Civilian Personnel office. At this early stage it is only necessary to give them a "heads up" on the coming of the system. They are the experts who can help you ensure the rules governing civilian personnel (from proper position description classification to union notification) are properly observed. Coordination with the Civilian Personnel

OTHER DEVICES

Besides telephone lines, you will need telephone modems or line drivers to telecommunicate data between remotely located peripheral devices and the CPU. You may also need modem sharing devices that will allow you to link remote peripheral devices to one telephone modem. If your major command is not located on your base, you will definitely need a modem to communicate data with them.

MODEMS. A modem (acronym stands for modulation/demodulation) is a hardware device that interfaces or connects a telephone line to the CPU. Your modems will be vendor supplied and will be compatible (be able to communicate) with the modems in use at your major command. The information systems people will need to know the speed at which the modems will transfer data. They will be capable of transmitting data at rates between 300 and 19,200 bits of data per second. However, we anticipate minimum transmission rates of 9,600 bits of data per second. Instead of using modems for short haul data transfer, consider using line drivers to satisfy this need.

LINE DRIVERS. Line drivers are less expensive than modems. They do not modulate and demodulate the data signal but rather act like an amplifier. They boost the data signal and "drive" it through the telephone lines to and from your CPU. If you are going to use line drivers be sure and tell the folks in the information systems organization. The more they know about your telecommunications equipment the better they can meet your needs. They need to know about your modems, line drivers, and if you will be using modem sharing devices.

MODEM SHARING DEVICES. A modem sharing unit provided by the vendor will allow up to three remote workstations or printers to be linked into a single modem simultaneously. A modem sharing unit could reduce the number of modems and telephone lines needed to support the system. Remember, coordinate with the information systems people. Coordination is important, so important in fact, that we have dedicated chapter four to it.

Chapter Three

COMMUNICATIONS

TELEPHONE LINES

You will probably have peripheral devices located more than 2000 feet from the CPU. If so, you will need telecommunications equipment (e.g. modems, line drivers, modem sharing devices). You will likely need to send and receive data to and from your major command counterparts. To communicate with the remote devices and your major command, you will need the telecommunications equipment mentioned above and telephone lines.

You will need intrabase telephone lines (short haul) and interbase lines (long haul). Get with the local information systems organization early on and make your requirements known. Short haul service will most likely not be a problem. If telephone lines are available, you are looking at a 60 to 90 day connection time. However, if the lines are not available, it could take 18 months to program, procure, and install the lines. Your long haul requirements may be satisfied by AUTOVON. AUTOVON can be used to transfer data, however you must inform the operator that you will be using the line for data transfer. The operator will flag the line so it will not be interrupted. Even though the line is flagged as a data service line, you can be pre-empted by a higher precedence call. Also, AUTOVON data transmissions can't exceed a continuous time of 18 minutes or a total time of one hour during normal duty hours. There is no time limit during other than normal duty hours. If AUTOVON will not satisfy your long haul needs, a dial-up commercial telephone line may be required. Getting the long haul commercial service is somewhat complicated. Plan on a four to six month lead time to get a commercial line. Get to know the information systems people; work closely with them and together you can solve any telephone problem that comes up.

something, and you have some unanswered questions, contact your major command headquarters counterparts. Remember, you have some real world experts at your major command who have gone through a similar minicomputer system installation process. They can help!

Another area that requires your attention early on in the planning process is telecommunications. Chapter three covers some of the communications equipment needed and explains the process to get support from the local information systems organization.

They are superior to solder-on connectors and are installed in a fraction of the time. Crimp-on connectors help ease the pain of cabling.

The best way to cable within a building is by routing the cable overhead. The cable may be routed above the ceiling and dropped to peripheral devices and the CPU. Cables should not be routed near power lines or powered equipment. Cabling between buildings is a little more difficult.

Cables installed between buildings must be routed underground in conduit to protect the cables both physically and electrically. You can use either metal conduit or Polyethylene water pipe. Both are available in several diameters, afford good protection to the cable and usually make it possible to replace damaged or failed cable without digging up the area. If you must cable between buildings consider using Polyethylene water pipe rather than metal conduit. It is easy to work with and does not require grounding. Placing the interbuilding cabling in underground conduit will protect the system equipment and software from being damaged by electromagnetic interference such as lightning and protect the cables from minor exterior fires.

FIRE PROTECTION

Get with your Fire Protection personnel early in the planning stages and together review and decide on fire protection measures. Fire protection can range from a nonwetting fire extinguisher for electrical equipment located in or near the entrance to the machine room all the way to a nonwater and nontoxic fire protection system specifically designed for the computer environment. The bottom line is use your Fire Protection experts. They can recommend the best type of extinguishers and can advise you of the best locations for their placement. They also will consider fire protection needs in the areas surrounding your machine room which are as important to the safety of your system as fire protection within the machine room.

SUMMARY

Hopefully, we have covered most of what you need to know about facility requirements. Our aim is to get you thinking about the things that must be accomplished to get your facility ready before the system arrives. If we forgot

EXPANSION

It is difficult to think of expansion in the early stages of planning for your system. Thinking of expansion needs now will prevent problems later. For example, the initial allocation of workstations and printers may not satisfy your needs. Set some coordinated goals such as one workstation for every two potential users and one workstation and printer for every secretary. Consider a training room equipped to handle ten to twelve peripheral devices. Now is the time to think of these future requirements. It is much easier to provide cable drops for these devices now while cables are being installed than in the future when conduits are full and raceways are covered. Consider at least two cable drops for each workstation. Cabling considerations are important and warrant being covered separately.

CABLING

You will need to know about the type of cable needed and cabling within and between buildings. The type of cable needed depends on what vendor is awarded the WIMS contract. There are different types of cable, and we can't cover them all here. Therefore, we cover only coaxial cabling and all references to cable, connectors, and cabling supplies pertain to coaxial cable. First, here are some things that may be helpful when ordering cable:

Cables should be twin-coax (Siamese type)- not individual strands.

Cable should not be sheathed- it will be difficult to pull through raceways.

A "1000 foot roll" actually only has 500 feet on it- since there are two strands each 500 feet long.

Cable strands should be discernable, as are stereo wires (one cable strand is striped). Otherwise, the installers will have to "Ohm out" the cable- a tedious process and unnecessary if the right cable is ordered.

Crimp-on connectors (both bayonet and screw type are required).

useless. We cannot over emphasize the importance of getting the proper power system installed correctly. Extra effort in this area up front will save much grief in the future. Once the system is up and running and has been for some time, how will your squadron operate without it? You should develop procedures for how you will operate without power or if the system becomes inoperative for an extended period.

EMERGENCY PROCEDURES

It is not necessary to have emergency operating procedures established prior to system installation. However, it is important to realize it will not be long after installation that the system will become "indispensible". Even when the system is down a few hours for periodic maintenance, the users will exclaim they can't do their jobs. Now is the time to consider alternative ways to get the job done should the system go down for a long time. Some things to consider are:

Get help from your major command counterparts. Get a copy of their emergency operating procedures.

Contact other government agencies in the area. If they have a compatible system, work an agreement to use their computer when yours is down and vice versa. Formalize the agreement in writing.

If there are no government agencies in the area with a compatible system, check with your vendor. They will either have a system you can use in an emergency or can give you the names of local civilian companies with compatible systems. Check with the companies but don't obligate the government. Get the base contracting office involved if any agreements are needed with civilian companies.

These ideas are only suggestions. The point is that you will need an emergency operations plan should use of the system be denied for an extended period. The plan should be logical, feasible, and tested periodically. It wasn't long ago that the Air Force Inspector General pulled the plug on base computers as part of a special inspection. They may do it again. More importantly, should a real life situation arise which requires an emergency operation plan, you will have one that works.

physical security devices (e.g.: locking cables) or other appropriate steps to protect your investment. You know how much security is required to protect your system. Our purpose here is to remind you that you need to think about physical security.

POWER

System power requirements are detailed and very important. You must consider static interference, special receptacles, dedicated circuits, power conditioning (provided by the WIMS contract), grounding, and, as a safety precaution, a power interruption device. Once you know the brand and type (or size) minicomputer you will receive, ask the vendor for a copy of their site planning guide. Get familiar with the system's special power requirements and get an electrical engineer and your electrical superintendant involved. The vendor's customer engineers will gladly help you prepare for the system installation. The contract will probably require them to measure the power to ensure it is free of damaging variations. Before the vendor measures the power ensure that:

No power lines for other equipment are installed in the same conduit with the minicomputer equipment power lines (to prevent static interference).

Special receptacles are installed and located so the equipment can be connected without using extension cords.

The CPU and disk drives have separate (dedicated) power lines.

A power conditioner is installed to keep the voltage and line frequency within tolerance. Power conditioning is part of the contract and will be taken care of by the vendor.

A true earth ground is provided for each circuit feeding power to the system components.

A means for disconnecting the power to all equipment in the machine room is readily available (a safety precaution).

Power is the life blood of the system. Without power the system is

Maintain the machine room humidity at about 40 percent. This is especially important during the winter months since heating dries the air and significantly reduces humidity.

Select furniture with anti-static upholstery and metal wheels. There is office equipment designed and built especially for computer sites.

Avoid installing the system in a carpeted area. If non anti-static carpeting is installed in the machine room, either remove it or periodically treat it with anti-static fluids. It's best not to have carpet installed in the machine room because it compounds problems with static electricity and airborne particles.

Airborne dust, dirt particles, and smoke can cause equipment operation or maintenance problems. A film of dust or dirt on internal surfaces can cause excessive wear of mechanical parts and malfunction of electronic components. Disk drive units are especially vulnerable to damage from excessive dust. Dust will be controlled by a heating, ventilating, and air conditioning system equipped with adequate filters. If the usual filters do not control dust effectively, consider installing an electrostatic filter.

Noise, unlike airborne particles, will not affect computer equipment or system operation, but may affect operator efficiency. Because some peripheral devices are noisy, consider noise when planning equipment placement. For example, you should not place the high speed line printer in the machine room or WIMS office because it is very noisy. It will also cause a lot of traffic in the area from users retrieving printouts. There are ways to reduce the noise (e.g. cloth-padded modular panels) but there is no practical way to eliminate or reduce traffic to and from this printer.

SECURITY

Physical security of the minicomputer system and peripheral devices (workstations and printers) must be maintained. The machine room and WIMS office should always be locked when unattended to prevent unauthorized entry and loss of supplies or damage to equipment. Peripheral devices should also be protected from loss or damage. If equipment security is suspect, recommend

Heat dissipated by other equipment. Only equipment directly related to the WIMS operation should be placed in the machine room. Include heat dissipated by lights when figuring the heat load.

Body heat. Each individual occupying the room will contribute about 400 BTUs per hour. We recommend the machine room be separated from the WIMS office by sliding glass doors. If you are able to do that you need not consider body heat.

Air flow. Check the volume, temperature, and humidity of fresh air entering the machine room. Poor ventilation will cause heat to build up near heat-generating equipment.

Direct sunlight. Direct sunlight can raise equipment temperature excessively without necessarily exceeding the allowable air temperature. Protect the equipment by shading exterior glass areas with drapes, blinds, or glass tinting films.

Humidity. The acceptable humidity range is between 40 and 60 percent. Humidity levels approaching the maximum limit may adversely affect the overall operating efficiency and should be avoided. In extremely humid areas you may need a dehumidifying unit. When the humidity is too low, input/output errors and loss of data may occur. Install a humidifier to add moisture to the air in the machine room, especially if static electricity charges build up because of low humidity.

Static electricity. Static electricity is annoying and can cause equipment malfunction. Minimizing or eliminating sources of static electricity is important. In addition to installing a humidifier here are a few other hints to help reduce static electricity.

Ground equipment cabinets. Be sure the minicomputer is connected to a true earth ground.

Pay particular attention to grounding disk drives. They are particularly susceptible to malfunctions or loss of data caused by static electricity.

Commanders and representatives from the vendor's local office. Get the Base Public Affairs personnel involved. Publish an article with pictures in the base newspaper. Let your civil engineering customers know what you are doing to be more responsive to their needs. You have come of age in the computer world, be proud and tell people about it.

Other things to think about when considering facility requirements are: environmental, security, power, emergency procedures, expansion, cabling requirements, and fire protection. Each of these is a major heading in this chapter. They are covered to make you aware of them and to point out their importance. Coordinate with agencies that can help you plan a successful system installation. We will highlight those agencies as we cover the particular area in which they will be helpful. Lets keep the ball rolling and look at environmental requirements.

ENVIRONMENTAL

Most modern minicomputer systems do not require special environmental considerations. In general, if the machine room is comfortable for the operators, it will be ok for the system. During the planning stage think about temperature, humidity, static electricity, airborne dust, and noise in the machine room. Don't forget the expert mechanical and electrical engineers in your squadron who can help you in these areas. Get them involved!

The recommended temperature range in the machine room is 60 to 80 degrees Fahrenheit. Keep the temperature relatively constant within this range, because excessive temperatures and frequent temperature variations can cause equipment failure. The installed heating and air conditioning system will probably keep the temperature relatively constant within allowable limits. However, consider a seperate cooling unit for the machine room as a backup or to help the installed system handle the heat load. Some factors to consider in determining the adequacy of existing temperature controls are:

Heat dissipated by the minicomputer system. The number of BTUs dissipated can range from 13,000 BTUs to 17,300 BTUs. The range depends on the number of disk drives and whether you place the high speed band printer in the machine room or elsewhere (recommend elsewhere because of the noise).

from the CPU (e.g.: Fire Department) must also be served using telecommunications (see chapter three). When considering the location for the system don't forget such things as:

Weights and floor loading. Vendor equipment will probably not exceed 50 pounds per square foot floor loading. Verify equipment weights with the vendor if floor loading is a concern.

The size of halls and doorways. Standard width halls and doorways will accomodate most vendor equipment. The vendor can identify any out-sized equipment.

Elevator capacities and loading facilities. The system must be moved to whatever location you select.

Sliding glass doors between the WIMS office and machine room. The tape drive must be monitored during taping operations.

Once you have decided on the location, think about making the machine room and WIMS office an impressive workplace. Consider such things as:

Drop ceilings with recessed lights.

Commerical grade, matching desks, chairs, and storage cabinets.

Carpeting in the WIMS office to add class.

Colored keyed wallcovering that accents the decor.

Coordinated mini-blinds or drapes on exterior wall windows.

Glass walls or large windows to show off the system from outside the machine room.

Interior decorations such as plants and pictures to help create a professional atmosphere.

Plan ahead and do all of this before the system arrives. After it is installed have an offical ribbon cutting ceremony. Invite the Wing and Base

Chapter Two

FACILITY REQUIREMENTS

SITE SURVEY

Your first task is to select the location for the system hardware and operators. The equipment will be located in the machine room and the system operators will work out of the WIMS office. The term, machine room, refers to the physical location of the minicomputer system. The WIMS office is the area adjacent to the machine room from which the WIMS operators will administer the system. So, what should you consider when searching for a place to set up the WIMS operation?

First, consider space requirements. You will probably be constrained by existing space. However, we recommend 250-300 square feet for the machine room. This amount of floor space will allow room for servicing equipment and includes space for storing tapes, disks, and other miscellaneous supplies and equipment. The WIMS office should be big enough for three to four full time operators and their desks, a work area, and storage space for system manuals, tapes, and other supplies. Recommend at least 500 square feet be acquired for the WIMS office. If possible, the high speed band printer should be located in a common area outside the machine room and WIMS office because it is noisy and will be visited frequently by users retrieving their printouts. A common area of about 35 square feet is needed for this printer. Now that you have an idea of the amount of space needed, next consider the location.

The machine room and WIMS office should be located within a 2000 foot radius of all offices serviced by the system. Workstations and printers can't be more than 2000 feet from the minicomputer Central Processing Unit (CPU) and still operate using the hard wire system. Devices located more than 2000 feet from the CPU must be attached remotely and operate using phone lines and modems, or line drivers (see chapter three). Users located more than 2000 feet

(YOUR ORGANIZATION'S LETTER HEAD PAPER)

From: (Your Organization)

(Date)

Subject: Request for BEAMS-to-WIMS Download Tapes

To: (Base Data Automation)

1. To ensure the successful interface of BEAMS and our new Work Information Management System (WIMS), we will need the BEAMS-to-WIMS download tapes on a regular schedule (see AFM 171-200 Vol XI R). We need the following tapes on the days indicated:

- a. The daily tape each work day.
- b. The weekly tape each Monday.
- c. The monthly tape on the first Monday of each month.
- d. The quarterly tape on the first Monday of each quarter.

2. The first tape that we will need is the quarterly tape to initially upload our WIMS system. We will need this tape on (date). The normal tape schedule must begin on Monday (date).

3. We greatly appreciate your assistance. Your help is extremely valuable to the success of our new system. If we can help you in this endeavor please let us know

(Recommend the Base Civil Engineer sign this letter)

Figure 1: Sample letter - Request for BEAMS-to-WIMS Download Tapes

(YOUR ORGANIZATION'S LETTER HEAD PAPER)

From: (Your Organization)

(Date)

Subject: Request for Operating Budget Ledger and Allotment Ledger tape

To: (Accounting and Finance and Data Automation)

1. Please provide us a tape of the Operating Budget Ledger (PCN SH0-191) and the Allotment Ledger (SH069-202) on a regular schedule beginning Monday, (date). We will need the tape on Monday, Wednesday, and Friday of each week. We will also need one tape on Monday, (date of first week of implementation).
2. The information on this tape will be used to update our newly acquired Work Information Management System. Your help is extremely valuable to the success of our new system. We certainly appreciate your assistance. If we can do anything to help you provide the data we need please call on us.

(Recommend the Base Civil Engineer sign this letter)

Figure 2: Sample letter - Request for Operating Budget Ledger and Allotment Ledger Tape

Chapter Five

MANNING

SYSTEM MANAGER

The System Manager is responsible for implementing and operating the system and for providing continuing technical support to the users. The System Manager should be identified early and be involved in the implementation of the system from the ground up. You, the WIMS Project Manager, need to work with the System Manager to ensure successful system implementation. The System Manager position, as well as all other positions in the WIMS office, will have to come from existing manpower authorizations. It is imperative that the System Manager be a civil engineering person and work full time in the WIMS office. The success of WIMS is the responsibility of the System Manager. This person must be free to devote full time and energy towards that goal. The System Manager's responsibilities include but are not limited to the following:

Coordinate the installation/modification of WIMS.

Operate the minicomputer.

Provide various levels and types of training to the users.

Provide specialized programming.

Control interface with other systems, especially BEAMS.

Coordinate and install software updates/changes.

Manage Automated Data Processing (ADP) equipment.

The System Manager cannot do all of these things alone. The WIMS office

should also be manned with an Operator, Program Analyst, and Word Processing Administrator all from in-house manpower resources.

OPERATOR

The Operator, like the System Manager, must be a civil engineering person and need not have special qualifications. Minimum qualifications are a sincere desire and high interest to work in a new and challenging job that will have a far reaching impact on the operation of your organization. Computer literacy is desirable but not required. The Operator will be responsible to the System Manager for the operation of the minicomputer. Some Operator responsibilities are:

Operation of the minicomputer.

Developing emergency operating procedures.

Developing expedient service call procedures.

Liaison between the WIMS office and the vendor.

Ordering equipment and supplies

Working with system users experiencing hardware/software problems.

Conducting user training classes.

The Operator should work full time for the System Manager. This person will work with the Program Analyst and the Word Processing Administrator.

PROGRAM ANALYST

If anyone working in the WIMS office needs specialized qualifications, it is the Program Analyst. The Program Analyst needs to be a civil engineering person (vice a data automater), needs to be identified early, and needs to be trained if not computer literate. This person should be familiar with Beginners

All-purpose Symbolic Instruction Code (BASIC), Common Business Oriented Language (COBOL), and Procedure programming languages. The Program Analyst must be familiar with these languages and civil engineering operations to develop specialized programs. The WIMS user developed and vendor supplied software will provide most of the programs needed initially. However, as users become familiar with the seemingly limitless capabilities of WIMS, they will require more sophisticated programs to help them in their jobs. The Program Analyst will develop these sophisticated programs as well as discover and correct errors in existing programs. The Program Analyst will also be responsible for:

Modifying programs for use in your organization.

Controlling the interface with other systems.

Providing documentation on developed programs.

Conducting specialized user training.

Implementing software updates/changes.

Besides the System Manager, Operator, and System Analyst, another important member of the WIMS team is the Word Processing Administrator.

WORD PROCESSING ADMINISTRATOR

The Word Processing Administrator should be a highly qualified secretary. This person will be required to learn a very sophisticated word processing software application, introduce the word processing package to all users, provide expert advice, and answer questions. Initially these duties can be part time if absolutely necessary. However, this person's position description should include the Word Processing Administrator duties. Eventually the position description should be expanded to include more data automation duties. The Word Processing Administrator position should evolve to a full time position in the WIMS office and be reclassified and upgraded. This position provides the opportunity for a highly qualified secretary to grow and attain pay grades not normally associated with the secretarial career field. Now that we have talked people, let's move on and cover equipment and supplies.

Chapter Six

EQUIPMENT AND SUPPLIES

INTRODUCTION

In this chapter we discuss things you need and things you may want to have to make the system just a little bit better. You will be working within a budget and some of the nice to have things may not be obtainable right away. However, work with the System Manager and Financial Management people to get these things on order, in next year's budget, or on the priority list of things to buy with year-end "fall-out money". We can't cover all possible equipment, supplies, and accessories in this guide. The things we do cover are either needed for the successful implementation of the system or for enhancing the professional atmosphere of the WIMS operation. You should get a copy of the vendor's supplies catalog to become familiar with the equipment and supplies available. We cover magnetic media, printer, and cabling supplies as well as furniture, environmental products, and accessories. We also provide tables of Recurring Supply Requirements, Table 1, One Time Supply Requirements, Table 2, and Recommended Supplies, Table 3. Let's get started with magnetic media supplies.

MAGNETIC MEDIA SUPPLIES

Magnetic media supplies include diskettes, disk packs, and tapes. You probably won't use diskettes in your day to day operation. However, you will need diskettes from time to time to send copies of programs or reports to other organizations using WIMS or to your major command. You should use only high quality diskettes. Bargain diskettes may save a few pennies at the time of purchase but could end up costing you more through lost data and the time needed to restore the data. Unlike diskettes, disk packs are used daily.

Disk packs are used in disk drives to store all system and operational software. Extra disk packs are needed to maintain software copies and to perform "clean-up" operations on the operational disk pack. Extra disk packs are needed to replace operational packs damaged during handling. Some precautions to take when handling or storing disk packs are:

Handle disk packs with care. Do not drop or seriously jar them. Mishandled disk packs, and those suspected of being mishandled, should be inspected before use.

Keep disk packs away from smoke, food, or drink. Do not handle disk packs while smoking.

Allow two to three hours for disk packs to adapt to different temperature and humidity environments. If at all possible keep extra disk packs in the machine room so they are stored at the temperature they will be used.

Store and operate disk packs in the proper environment; between 50 and 125 degrees Fahrenheit.

Besides diskettes and disk packs, you need magnetic tapes. Magnetic tapes are used to backup (make copies) of the operational software. Backup tapes are used to restore lost data to disk packs. You need 600 foot and 2400 foot tapes. The 600 foot tapes are used to store small programs, reports, or data, and are handy for mailing. The longer tapes are used to backup the system. Magnetic media supplies are used primarily by the system operators. Printer supplies are used by system users throughout the organization.

SUPPLIES FOR PRINTERS

The system includes letter quality printers (dot-matrix and Daisywheel), draft quality matrix printers, and a high speed band printer. To support these printers you will need ribbons, printwheels, print bands and paper. Use the formulas in Table 1 to determine initial order quantities and monthly recurring requirements. We discuss these supplies in the order listed above- first, ribbons.

You should use high quality multi-strike rather than single strike ribbons. Even high quality ribbons will, on occasion, break. If a ribbon breaks with considerable unused ribbon left in the cartridge, don't throw it away! It can be repaired. To repair broken ribbons, first pry the ribbon cartridge apart using a knife blade or similar instrument. Next, remove the used portion of the ribbon from the take-up spool. Then, using tape, re-attach the end of the unused ribbon to the take-up spool. Finally, squeeze the ribbon cartridge back together. This is a simple process and can save a lot of supply money. In addition to ribbons, Daisywheel printers use printwheels.

Plastic and metal printwheels are available. Plastic printwheels are not as durable as metal but are less expensive. Metal printwheels cost as much as seven times the price of plastic ones. Plastic printwheels provide excellent print quality at a low cost-per-impression and are the best buy. Printwheels can be damaged by improper storage or handling. Here are some tips for protecting them:

Always store printwheels in individual protective containers. Improper storage may result in permanent damage.

Avoid touching the spokes. Handle the printwheel by the center hub only. Printwheel tolerances are narrow and can be easily altered if mishandled. Metal printwheel spokes are particularly delicate.

Never expose printwheels to extreme temperatures. High heat can warp spokes and destroy the wheel.

Clean printwheels on a regular basis for sharp, clear impression quality and long life. Dirt and grime can shorten character life. Use cleaning kits designed especially for printwheels.

The high speed printer does not use printwheels. Instead, it uses a print band. Print bands are made of metal and are not handled like printwheels. Therefore, they do not wear out quickly and are unlikely to be damaged. However, practically all data processing documents are printed on the high speed printer. This printer is indispensable to the operation. Having a spare print band is good insurance should this printer go down because of a damaged print band. Each model printer uses its own type of ribbon and print device, but they all use either the standard bond or computer printout paper.

In addition to letter head and bond paper, you need computer printout paper for the high speed printer. The General Services Administration (GSA) store on base carries this paper. It's a good idea to keep a three months supply (about 50 boxes) on hand in case the GSA store runs out. You also need a good stock of letter head and plain bond paper because you will use more after automation. Rather than correct correspondence using a typewriter, it is easier and quicker to make corrections using the workstation and print it again. Also, because it is so easy to make changes, drafters will make changes after a document is printed that they might not otherwise make. Because of these reasons, the quantity of bond and letter head paper used will increase.

CABLING SUPPLIES

Cabling supplies consist of cable, connectors and adapters, and connector assembly tools. The specific type of cabling supplies needed is vendor dependent. In chapter two we limited the discussion of cabling to the coaxial cables that run between the CPU and peripheral devices. We again concentrate on this type of cable and associated supplies. Dual coaxial cable can be ordered in bulk or in pre-assembled lengths (i.e. cut to specific lengths with connectors installed) and with either teflon or PVC coating. Pre-assembled cable is more expensive than bulk cable and teflon coated cable costs almost six times more than PVC coated cable. We recommend ordering bulk quantities of PVC coated dual coaxial cable. But remember, a "2000 foot roll" of dual coaxial cable only has 1000 feet on it (two strands each 1000 feet long) and it comes un-assembled, that is with no connectors installed.

To use the bulk cable you will have to cut it to the required length and install the connectors. There are two types of connectors: a twist and lock type called a Bayonet Nut Coupling (BNC) connector and a threaded screw on type called a Threaded Nut Coupling (TNC) connector. Both type connectors come in crimp-on and solder-on styles. The crimp-on style connectors are much easier and faster to install using the proper assembly tools. You also need about 20 each of the BNC and TNC cable "splicing" adapters. They are used to mate or "splice" the standard dual coaxial workstation/printer device cables (a 25 foot cable that comes as part of each workstation and peripheral device) together.

The proper assembly tools for installing the BNC and TNC connectors are a stripping tool and a crimping tool. The preferred stripping tool is adjustable and strips the cable in one step. It should be designed to open wide to accept the coaxial cable and then snapped shut and rotated to strip both the cable jacket and dielectric at the same time. The crimping tool should have safety grip handles and be of high quality to give a solid connection. It should have ratchet action to automatically prevent release until the crimping cycle is complete. The BNC/TNC crimping die set is not part of the crimping tool and must be ordered separately. Your vendor customer engineer can show you how to use the stripping and crimping tools properly to create a professional trouble-free connection every time.

FURNITURE

You should acquire commercial grade matched furniture and storage cabinets for the WIMS office. There are vendors who specialize in computer workplace furniture. Become acquainted with the various media storage and workstation furniture available by reviewing vendor catalogs. If you are unable to order workstation tables and special chairs initially, you should be able to acquire them later if you identify your requirements, justify them, and get them into your budget. However, you need media storage cabinets right away. Before the system becomes operational, there will be magnetic tapes, diskettes, ribbons, and numerous other supplies to store and, after the system becomes operational, there will be computer printouts to store. The only efficient way to store these items is in media storage cabinets specifically designed and configured for them. Media storage cabinets and the associated shelving and hanging devices should be priority one when considering furniture requirements. Your overall goal is to outfit the WIMS office and each workstation/printer workplace with professional furniture designed specifically for computer operations.

ENVIRONMENTAL PRODUCTS

Some things to consider in this category of products are power protectors, anti-static mats and spray, workstation dust covers, acoustic printer cabinets, and anti-glare panels for the workstations. Some items are recommended for the safety of the system while others are recommended for the convenience and

comfort of the users.

Power protectors provide for system safety by protecting workstations from damaging interference and high voltage transients. If there are frequent electrical storms in your area, consider connecting the workstations to a power protector to ensure the safety of the system and data. Be sure and discuss this subject with your vendor customer engineer, who is a good source of advice on the need for power protectors.

Static electricity in the air can also cause problems, such as logic errors, memory loss, and intermittent hardware failures. To combat static electricity problems you should use anti-static chair and carpet mats and anti-static spray. Anti-static chair mats are used on carpeted surfaces. They have a static neutralizer grid sealed in that won't wear off. Anti-static carpet mats come in a variety of colors and with a safety skid-proof vinyl back which resists slipping on bare floors or carpets. They are easy to maintain and shampooing will not harm the anti-static properties. Using an anti-static spray is a low-cost way to combat static electricity. These sprays are water-based, non-toxic, and can be applied to floors, carpets, clothing, and furniture. All of these products significantly reduce the problems associated with static electricity in the air.

Airborne dust is another problem causer. Dust in keyboards can cause excessive wear and improper operation. Also dust and dirt particles can cause malfunctions in the workstation electronics. Anti-static dust covers provide inexpensive protection against dust problems. Dust covers, anti-static products, and power protectors provide are products that provide safety protection for the system.

Acoustic printer cabinets and anti-glare panels are products that enhance user comfort and convenience. Dot matrix and Daisywheel letter quality printers are rather noisy. One way to solve the noise problem is to locate all printers out of earshot. This places the printer a considerable distance from its associated workstation and is not practicable. A better solution is to acquire acoustic printer cabinets. Good acoustic printer cabinets are heavily constructed and come with foam liners that trap up to 80 percent of annoying noise. Acoustic printer cabinets are certainly not required, but should printer noise be a problem, they are an effective solution.

Other problems users may face are eyestrain, fatigue, and stressful headaches associated with cathode ray tube (CRT) screen glare. These are frequent complaints of users and are potential threats to productivity. Should users encounter any of these problems, it would be nice to have an anti-glare panel available to install on the workstation. A good anti-glare panel eliminates up to 94 percent of the reflected light on the CRT screen with no reduction in image clarity. Anti-glare panels will not be required by all system users, but some may suffer from the ailments mentioned and an anti-glare panel will bring welcomed relief.

ACCESSORIES

There are hundreds, perhaps thousands, of accessories available for your system. We certainly can't mention them all. We mention those accessories we feel are necessary for system operation. These are a computer image projection system, a vacuum cleaner, cleaning kits, and printwheel cases.

You will need a computer image projector when the WIMS implementation team arrives at your base. You also need this projector to conduct in-house system orientation and training. There are several computer image projectors on the market. Contact local vendors for demonstrations and price quotes. Also contact your major command counterparts for information they may have on projectors. It may be possible and even more economical to rent a projector rather than purchase it. Either way, at least two workstations should be modified by the vendor customer engineers for use with the image projector.

Unlike the projector, a vacuum cleaner is needed but not early in the system acquisition phase. The small, hand held vacuum cleaner should come with accessories that allow access to small spaces for removing dust, dirt particles, and paper scraps. Paper scraps will accumulate inside the high speed printer. It should be vacuumed periodically to ensure proper operation. The vacuum can also be used to clean workstation keyboards.

In addition to the vacuum cleaner, you need cleaning kits for the tape drive, diskette drive, and printwheels. Residue build up on the tape drive heads can affect the operation of the tape drive and data transfer. Low cost tape and diskette drive cleaning kits are available. As mentioned before, printwheels are delicate and should be handled carefully. Cleaning kits specifically for

printwheels are designed to protect your printwheels during the cleaning process. The printwheels are placed in the cleaning kit, non-toxic cleaning solution added, and the lid to the kit closed and rotated.

Printwheels need to be protected during cleaning and during storage. Even though printwheels come in their own individual cases, you should acquire at least one printwheel file album for each Daisywheel printer. These albums hold up to six printwheels and protect them from damage from handling, spills, or improper storage. Also, they keep frequently used printwheels handy.

Before leaving this chapter and going on to a discussion of training, we have provided tables covering supplies and equipment. The tables list recurring requirements, one time requirements, and recommended items.

Table 1. RECURRING SUPPLY REQUIREMENTS

Based on HQ TAC/DE experience

Hint: Order six months requirements at the outset.

When stock level reaches 50%,
re-order initial quantity plus 10%.

<u>Description</u>	<u>Initial Order</u>	<u>Recurring Requirements</u>
Ribbon for printers	6 mos.	(3.3 ribbons)(No. of printers)(4 weeks)=Ribbons req'd per month.
Ribbon for Hi speed printer	6 mos.	(1.2 ribbons)(No. of printers)(1 month)=Ribbons req'd per month. If you have 1 hi speed printer, you will need 2 ribbons per month.
Paper for Hi speed printer	6 mos.	(3.8 boxes)(No. of printers)(4 weeks)=Paper req'd per month. If you have 1 hi speed printer, you will need 16 boxes of paper per month.
Bond paper	6 mos.	(0.4 reams)(No. of printers)(4 weeks)=Paper req'd per month.
Letterhead paper	6 mos.	(0.3 reams)(No. of printers)(4 weeks)=Paper req'd per month.
Vacuum cleaner bags	6 mos.	1 per month.
Magnetic tapes	100 Ea. (2400')	(3 tapes)(No. 75MB Drives)(1 month)=Tapes req'd per month. Note, double quantity for a 288MB Drive.
Magnetic tapes	30 Ea. (600')	As required
Printwheels	6 mos.	(6 ea type)(No. of printers)(1/2 year)=Printwheels req'd per 6 mos. Note, order quantity of each type/pitch for each letter quality printer.

FUNCTIONAL APPLICATIONS HANDBOOK

The Functional Applications Handbook explains the concepts, philosophy, and responsibilities inherent in owning and operating an information management system within a civil engineering organization. It also contains documentation of the WIMS applications, user instructions, and policy on modifications.

FUNCTIONAL PRE-IMPLEMENTATION REQUIREMENTS

The Functional Pre-implementation Requirements document covers actions necessary to integrate local management requirements into the WIMS software and to prepare for uploading operational data into the system. It also covers training requirements and coordination with outside agencies to be accomplished prior to the arrival of the Major Command Functional Implementation Team.

FUNCTIONAL SOFTWARE IMPLEMENTATION GUIDE

The Functional Software Implementation Guide is intended for use by the Major Command Functional Implementation Team to establish the WIMS applications and tailor them to the management requirements of your organization. WIMS will become operational in your organization once the actions in this guide are completed.

BCE STAFF HANDBOOK

The BCE Staff Handbook covers WIMS management concepts, philosophy, responsibilities, pitfalls, evolution, and growth. It also covers an overview of the standard WIMS model.

We have covered the official documentation here. In the next chapter we look at publications and other sources of invaluable information about the system operation, management, and lessons learned by those who have experience in managing a system.

Chapter Ten

DOCUMENTATION

INTRODUCTION

There are several WIMS documentation packages available or being developed. All of them have been or are being produced by, or under the direction of, the Information Management Systems Office at the Air Force Engineering and Services Center, Tyndall AFB. Besides this guide, the documentation packages available are: the Systems Manager's Guide, the System Implementation Guide, a Functional Applications Handbook, Functional Pre-implementation Requirements, a Functional Software Implementation Guide, and the BCE Staff Handbook. We offer a brief synopsis of each beginning with the Systems Manager's Guide.

SYSTEMS MANAGER'S GUIDE

The Systems Manager's Guide covers management of the overall system. It also covers some aspects of system operation, excluding specific WIMS application software. Included are sections on file management, backup and restore operations, word processing, and establishing a menu driven system.

SYSTEM IMPLEMENTATION GUIDE

The System Implementation Guide is intended for use by the Major Command System Implementation Team in helping to establish an initial operating capability after the system is installed by the vendor. It is oriented toward making the System Manager more familiar with the new system and helping to establish a basic foundation to begin integrating the system into the organization.

WIMS PROGRAMS

The WIMS programs were developed by a team of civil engineering personnel from around the Air Force who knew what they needed in the way of automation to help get the job done. Together with some experienced civil engineering information management people they developed the WIMS prototype programs. These programs will have been tested, modified, and proven before they are released as the official WIMS software. It is important to note that the WIMS software was developed by users for users. Any program, with the exception of those that interact with BEAMS, can be modified. Included in WIMS are programs to help manage job orders and work orders, labor reporting, the engineering design schedule, fire protection functions, housing management functions, energy conservation, and real property records to name just a few. Virtually every function in civil engineering will be automated to some degree under WIMS. These programs will be well documented. The documentation is included in the WIMS software package. Other documentation developed or being developed to help implement and operate WIMS is covered in the next chapter.

Supports all other system programs.

There are too many system programs in the WIMS contract to cover them all here. However, we discuss briefly some of the programs that will be used the most. They are: word processing, graphics, data file development, and report writing programs.

The word processing program is versatile and easy to use. It includes such capabilities as sort, merge, replace, copy, move, insert and delete. The best way to learn word processing is to go through the self-teaching training manuals that are part of the word processing package. Users will be able to produce very professional word processing documents.

The graphics software allows system users to produce bar, line, and pie charts using a graphics workstation and print them using a dot-matrix impact printer. Very sophisticated graphics including shading, segmenting, multiple line styles, and integrated legends and commentary can be produced. They can be incorporated into word processing documents or used alone as visual aids to support a briefing. The graphics program can create charts using numerical data input by the user or retrieved from data files.

The data file development software consists of control and data entry programs. The control program is used to define the structure, use, and general characteristics of the data file. Once the data file characteristics are defined, then the data entry program is used to input the data. When the data is loaded in the data file, the report writing program is used to produce reports.

With the report program, users can develop reports specifying the report content and layout. The report content includes the data file fields to be used, how the data is to be sorted, whether we want subtotals or not, and how we want the report printed. The report layout concerns how the report will look when printed. Included are the report title, field sequence and spacing between fields. The report program stores each report in a special file for periodic review and update. It allows users to produce useful, expertly formatted, professional reports containing only selected, pertinent data. The report, data file development, graphics, and word processing software programs are just a few of the system programs. These system programs are used with the specific programs developed for WIMS.

Chapter Nine

SOFTWARE

INTRODUCTION

The hardware discussed in the last chapter is virtually useless without software. Software is the programs that cause the computer to perform certain functions. Here we discuss the operating system, some system programs included in the WIMS buy, and WIMS software development. First, the operating system.

OPERATING SYSTEM

An operating system is a set of programs that act as a link between users, programs (software), and hardware resources. The operating system provides support to WIMS as a whole. User programs, on the other hand, are instructions to support direct functions such as job order management, real property inventory records, or engineering design schedules. An operating system:

Communicates with users regarding the status of programs and files.

Determines priorities if conflicts between users or programs arise.

Protects the system memory from accidental or deliberate attempts to modify or destroy it.

Schedules jobs for the most efficient use of the system and its resources.

example, one bin can be loaded with your squadron letter head paper while the second bin contains plain bond. The user specifies bin one for the first page of the document and bin two for all subsequent pages. Twin sheet feeders allow the user to print several documents without having to feed each sheet of paper into the printer. They are very convenient pieces of hardware. But, hardware is useless without the software to make it do the job. We discuss software in the next chapter.

impact printer that supports local WP and DP. WP documents can be printed using either letter-quality or high-speed draft-quality output. Numerous character fonts are available to produce different print styles. This printer accepts either single-sheet or continuous-form paper.

The matrix printer, like the high-density model, is also a dot-matrix impact printer. However, it can only produce draft-quality documents. The local model connects to the CPU through a cable. It can print both WP and DP documents. The remote model connects to a remote workstation which is linked to the CPU via telecommunications. It can only produce DP documents.

The matrix printer prints in only one typestyle, but the daisy printer prints in a variety of typestyles. Daisy printers use interchangeable metal or plastic print wheels to produce letter-quality documents. This printer connects to the CPU through a cable and supports both WP and DP applications. It can print forms with up to six parts, and can use either single sheet or continuous-form paper. The WIMS specifications call for this printer to have a wide carriage to accommodate paper up to about 15 inches in width.

All printers mentioned so far normally use single sheet paper. The band printer uses continuous-form computer paper. This printer is used to print practically all DP documents produced by the system users. It will also support WP applications. The band printer is a high speed printer that uses interchangeable steel print bands to produce draft-quality output. Print bands are available in a variety of typestyles, and can be changed by the operator. Some of the other printers mentioned can use continuous-form paper also, but to do so they need a forms tractor.

OTHER PERIPHERALS

Forms tractors and twin sheet feeders are peripheral devices available for the high-density matrix and the daisy printers. Forms tractors enable continuous-form paper to be used with these printers. They accept various paper widths and up to six part forms. Racks are provided to contain ingoing and outgoing paper flow. Twin sheet feeders come in several models to accomodate different paper sizes. They are electronically controlled devices that continuously feed paper to the printer as needed. The two paper bins make it possible to use two different types of paper in printing a document. For

facilitate data retrieval. They feature fully removable disk packs. The disk drive included in the WIMS buy have disk packs with storage capacities of almost 290 million bytes (individual characters) of data. Any number of removable disk packs can be stored off line (not installed in the disk drive) offering virtually unlimited storage potential. The CPU accesses information on the disk pack, processes it, and returns it to storage on the disk very rapidly. Another storage device must be used to backup information on the disks. That's the reason for the tape drive.

TAPE DRIVES

Tape drives allow large amounts of data to be stored on magnetic tapes. Magnetic tapes are cost-effective and with the tape drive are used to backup or transfer information between one system and another. The tape drive is used to backup information on the disk and transfer BEAMS and financial data to WIMS. It can also be used to make tapes of programs or data to be mailed to other organizations. The tape drive, disk drive, and CPU will be used in the machine room. Workstations will be used throughout the organization.

WORKSTATIONS

You will receive workstations that support local applications as well as remote workstations. Local workstations connect directly to the CPU through a cable (up to 2000 feet in length) while remote workstations operate via a modem and a telecommunications link. Models that support only data processing (DP) applications as well as models that support both DP and word processing (WP) applications are part of the WIMS buy. Also, a graphics workstation is included in the buy. This workstation, along with the graphics software package, is used to produce professional graphs and charts. The graphs and charts can only be printed using a dot-matrix printer.

PRINTERS

The WIMS contract calls for five different models of printers. They are high-density matrix, matrix (one model for local use and one for remote use), daisy, and band printers. The high-density matrix printer is a dot-matrix

Chapter Eight

HARDWARE

INTRODUCTION

Throughout this guide you have seen the words CPU, disk drive, tape drive, workstations, and printers. These are the main pieces of hardware which make up the WIMS minicomputer system. In this chapter we introduce you to this hardware and discuss, in general terms, the use of each component. We will also cover some other peripheral items. The CPU is one of the most important pieces of hardware, so let's begin with it.

CENTRAL PROCESSING UNIT (CPU)

The CPU, the "brains" of WIMS, comes with a very powerful operating system. It will support a variety of utilities (programs), program development tools, and programming languages. These capabilities, along with word processing, provide unlimited versatility and control of information. It is the CPU that does mathematical calculations, merging, sorting, or copying data, and other data manipulation. The WIMS CPU is equipped with small intelligent processors to support communications operations. It can communicate with the same brand of computer as itself as well as computers from other manufacturers. The CPU processes and stores information internally. However, it can't store enough data internally to support WIMS. Thus, the need for disk drives.

DISK DRIVES

Disk drives combine high-speed access and a large storage capacity to

Data processing training is more detailed and time consuming than either executive or word processing training. It should consist of an indepth orientation, security, creating specialized data entry screens, creating control and data files, writing and copying reports, running inquiries on existing data files, and an introduction to the programming utility. Data processing training must be hands-on training conducted in the training room, away from interruptions. Once users are well versed in common aspects of data processing, offer an advanced class covering sophisticated data processing programs.

Not everyone is going to progress through the training classes at the same speed or level of comprehension. The training classes should be small so individual attention can be given to the trainees. Also, once the class is completed most "graduates" will still require help in certain areas. The WIMS office personnel must be patient and helpful to ensure users feel free to ask them for help. The way the training is conducted and the attitude of the trainers play a very important role in the success of the system. The training program objective is to produce well trained users who understand how the system can help them in their jobs and who can effectively use the system hardware covered in the next chapter.

part of the system buy. They should also attend specific vendor training that will enhance their knowledge and capability to perform their jobs. If the System Analyst is not familiar with COBOL, the US Army offers a two week long Structured COBOL Programming Course [CRS# (JT) 7E-F11] at the Army Management Engineering Training Center (AMETA), Rock Island Arsenal, Illinois. They can be reached at AUTOVON 793-4041. It is important that the WIMS office personnel be properly trained, because they are responsible for training the users.

USER TRAINING

User training consists of orientation, executive, word processing, and data processing training. Orientation training should be provided to everyone. It should introduce WIMS. Orientation training is not hands-on training, rather it is an overview of system capabilities and hardware. A tour of the WIMS office and machine room and an explanation of the WIMS hardware should be included. Also include a "show and tell" session using the projection system and applicable software. Orientation training should help reduce the users' fear of automation. It is important to keep this training simple and not overwhelm people with details. Some details are included in executive training.

Executive training will train executive level personnel to use the system. It must be hands-on training and should include an indepth orientation, security of the system and data, report access, and report writing. Executives don't have the time to develop the data bases and other files necessary to produce reports. However, they should be able to access reports available on the system and write reports. Some executives may want word processing training, but don't include word processing in executive training.

Word processing training should be a separate block of training taught by the Word Processing Administrator. The classroom portion of word processing training will be short and consist of an indepth orientation and a discussion of document security. The actual hands-on training will probably be a self-taught, self-paced program using vendor supplied training manuals. The Word Processing Administrator must be available to answer individual questions as trainees progress through the manuals. Since word processing is self-taught, the training room will be available to conduct data processing training at the same time.

Chapter Seven

TRAINING

PHILOSOPHY

People resist automation for several reasons. One reason is because they fear the unknown- new technology. They don't understand how to use the system and don't know what it can do for them. Another reason people resist automation is because they feel the new system is being forced upon them. A sound training program and involvement by the Base Civil Engineer (BCE) and top level management in the squadron can overcome any resistance the users may have to use the system. Everyone in the squadron should be trained on WIMS. Some people will only receive orientation training while others will receive a wide range of training- from orientation to advanced data processing training. Getting everyone involved in WIMS will overcome their fear of the unknown. The BCE and top level management must be involved in WIMS also. They must be strong, visible supporters and users of the system. In addition to being trained to use the system, they must "sell the system" to the users rather than force it upon them. They must understand that people will resist using the system at first. The BCE and top level management must bring their people slowly into the world of automation.

WIMS OFFICE PERSONNEL TRAINING

Training for the people running WIMS is available from Tinker AFB, your MAJCOM, the vendor, and from the US Army. The System Manager should visit the WIMS office at Tinker AFB, or your parent MAJCOM's lead base, for one to two weeks of orientation and introduction on WIMS. An introduction to WIMS hardware capabilities is also available at your MAJCOM Management Information Systems office. Specific training on system operation is available from the vendor. The System Manager, Operator, Program Analyst, and Word Processing Administrator should attend the various vendor training provided as

TABLE 3. RECOMMENDED SUPPLIES
(NOT REQUIRED)

<u>Description</u>	<u>Initial Order</u>
Dust Cover for Workstation	1 per workstation + 10%
Acoustic Sound Cover	1 per letter quality printer as required
Cable, 50' extension, PVC	1 per 4 workstations and printers
TNC Cable Splicing Adapter	1 per 50' cable
BNC Cable Splicing Adapter	1 per 50' cable
Table/Chair for Workstations	1 per workstation
Media Storage Cabinets	3 per WIMS office

TABLE 2. ONE TIME SUPPLY REQUIREMENTS

(Minimum)

May eventually be reordered.

<u>Description</u>	<u>Initial Order</u>
Floppy Diskettes for Diskette Drive	50 diskettes (5 Boxes)
Disk Pack for Disk Drive	2 per disk drive + 1
Vacuum Cleaner for Computer Room	1 per system
Cleaning Kit for Tape Drive	1 per tape drive
Cleaning Kit for Diskette Drive	1 per diskette drive
Power Protector	1 (for Command Console) + more as required
Printwheel Album	1 per letter quality printer + as required for printwheel storage
Printwheel Cleaning Kit	1 per letter quality printer (Daisywheel)

Chapter Eleven

INFORMATION DISSEMINATION/LESSONS LEARNED

INTRODUCTION

There are many sources of information about setting up and operating a management information system such as the one you will receive. There are experts at your major command and the Engineering and Services Center. There is also written documentation that contain hints for making the system better based on lessons learned from experience. In this chapter we discuss the means by which information, including lessons learned, is disseminated. Included are the WIMS System Manager's Guide, newsletters, conferences, the Central Program Information Library, and user groups.

WIMS SYSTEM MANAGER'S GUIDE

The WIMS System Manager's Guide is the "bible" by which the system must be managed. It was developed by experts who have implemented successful information management systems. It is important to note that these "experts" are not data automators or computer programmers but rather civil engineering officers, civilians, and NCOs who have become experts in civil engineering information management. The WIMS System Manager's Guide contains their corporate knowledge which, if followed, will make your system compatible with or "the same as" WIMS operations at bases throughout the Air Force. This is important because of information transfer and of personnel transfers. Information communicated from your system to another system will be able to be used by the receiving organization with minimum change if the WIMS System Manager's Guide is followed. Also users of your system will be able to use the system in another civil engineering organization because of the standardization afforded by this guide. The WIMS System Manager's Guide will be updated as improvements in the management of the system are developed. Newsletters are also used to relay update information and lessons learned.

NEWSLETTERS

The Automated Data Processing (ADP) Newsletter, newsletters published by major commands, and the System Administrator's Notes are avenues for providing information about WIMS to users. The ADP Newsletter is produced by the Air Force Data Systems Design Office at Gunter Air Force Station, Alabama. It is not published to provide information about WIMS exclusively, but rather contains information about Air Force wide automation efforts. It will, when appropriate, contain important information about WIMS. Major command engineering and services newsletters, much like the ADP Newsletter, contain information covering a wide range of subjects. However, they are an excellent means to pass pertinent information about WIMS to the bases. Unlike the ADP Newsletter and major command newsletters, the System Administrator's Notes is designed to provide specific information about civil engineering information management systems. It is published by the Air Force Engineering and Services Center and contains significant information on system enhancement and management. It also covers subjects of particular interest to system administrators based on their inquiries and discussions at the System Administrator's Conferences.

CONFERENCES

The Air Force Engineering and Services Center hosts a System Administrator's Conference twice a year. This conference brings together all system administrators from the major commands. Base level system managers will be invited to this conference until the major commands establish their own conferences. Knowledgeable administrators provide demonstrations on the more sophisticated applications they have developed. They also provide hints on how to make the systems easier to use. Information about the latest hardware developments and innovative software applications available in the Central Program Information Library is also presented at this conference.

CENTRAL PROGRAM INFORMATION LIBRARY

The Central Program Information Library maintained at the Air Force Engineering and Services Center contains a synopsis of programs that are, or could be, of benefit to users worldwide. Its purpose is to preclude users from spending valuable time developing programs already available. A program

needed at one base may very well be needed at another. Acquiring the program from the central library and modifying it as necessary to meet your organization's needs is a lot easier than starting from scratch. The programs maintained in this library were developed by civil engineering information management system users at all levels. A list of the programs in the library is published in the System Administrator's Notes and is available from your major command. The last means of obtaining information and exchanging lessons learned that we will mention is participating in users' groups.

USERS' GROUPS

Users' groups are comprised of individuals or organizations who use the same brand of computer. There are users' groups for most of the major brands of computers. They hold conferences and publish newsletters that introduce new hardware and software developments as well as provide a wealth of information. Perhaps the greatest benefit of users' group conferences is that they bring together users from a wide variety of private and government agencies who share experiences, problems, and, more important, solutions to problems. You can usually talk with someone who has experienced your problem and solved it. It is fitting to conclude this guide with a discussion of users' groups for once your organization joins a users' group, it has passed the WIMS implementation period and has become a successful user. This guide begins the evolution to a successful Work Information Management System; joining a users' group culminates it.

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