AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

IMPLEMENTING AUTOMATED INFORMATION SYSTEMS IN THE AIR FORCE

MAJOR JAMES P. TOTSCH 84-2605

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AUTHOR(S) MAJOR JAMES P. TOTSCH, USAF

FACULTY ADVISOR MAJOR CHARLES E. ZIMMER, JR., ACSC/EDCM

SPONSOR LIEUTENANT COLONEL CARROLL E. GOWINS, ACSC/EDCM

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Presents the step-by-step procedures one must follow to initiate, plan, organize, implement, and maintain an automated information system. Project also evaluates Air Force guidance on implementing these systems from a user's perspective and recommends actions to ease the burden on the system implementer.

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PREFACE

This paper was prepared with two purposes in mind. The first was to review and evaluate Air Force guidance on implementing information systems from the position of one who has done it. The second purpose was to provide step-by-step procedures and potential pitfalls future implementers of information systems might encounter.

The author would like to thank Major Chip Zimmer, the advisor for this paper, for his help and cooperation during its preparation.

ABOUT THE AUTHOR

Major James P. Totsch was assigned to the Administrative Systems Management Division, Directorate of Administration, HQ USAF, in an Air Staff Training (ASTRA) position from October 1979 to November 1980. His ASTRA training culminated in his assignment as the Chief, Logistics Information Systems Policy, Deputy Chief of Staff, Logistics and Engineering, HQ USAF - a position he held until his reassignment to Air Command and Staff College. While assigned as the Chief, Logistics Information Systems Policy, he implemented an information system for HQ USAF/LE which included the installation of over 150 work stations for the professional and administrative staff. He was also responsible for planning and developing the architectural network for integrating all logistics information systems.

Major Totsch coauthored the article "Logistics Information 'Management Support' System" published in the Fall 1982 Air Force Journal of Logistics.

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EXECUTIVE SUMMARY

Part of our College mission is distribution of the students' problem solving products to DoD sponsors and other interested agencies to enhance insight into contemporary, defense related issues. While the College has accepted this product as meeting academic requirements for graduation, the views and opinions expressed or implied are solely those of the author and should not be construed as carrying official sanction.

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The Report Purpose →

I. Purpose: To review and evaluate Air Force guidance on implementing information systems and to provide step-by-step procedures on how to implement such systems. → to 1473

II. Problem: The rapidly changing technology in the computer hardware and software areas, as well as advances in electronic communications, has spawned a merging of disciplines into what is known today as information systems. The Congressional passage of Public Law 96-511 or the Paperwork Reduction Act of 1980 has caused Federal agencies to start viewing information as a resource and to develop information resources management (IRM) policy. Developing this policy requires a new perspective on the Air Force's approach to management and control of word processing equipment, computers, and telecommunications equipment.

III. Data: The Air Staff formed the new Assistant Chief of Staff for Information Sytems on 1 June 1983. That agency is struggling with the problem of developing IRM guidance for the Air Force. The Air Force has several agencies and individuals who have implemented information systems in recent years. They understand the difficulties involved in implementing a system so diverse that it

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crosses several functional lines. Using the experiences of these individuals and those of civilian managers who have done similar work within their industries, the Air Staff can develop guidance and step-by-step procedures that lead a user through the planning, organizing, developing, and controlling of information systems.

IV. Conclusions: The Air Force is having difficulty converting the controls they had over mainframe computers into a manageable approach for handling the micro-technology and networking involved in the information environment today. The Air Staff is struggling with the difficult problem of releasing the controls on these systems without opening the flood gates. Lessons within industry show that many companies have addressed this problem through an evolutionary, phased development approach.

V. Recommendations: The new Air Staff organization must exert creative leadership so the rest of the Air Force can benefit from this new technology and information systems approach. They must loosen the reigns on previous controls that were very well required. However, the micro-technology of today and the electronic networking available make these controls outdated. New guidance must identify the steps involved in managing the new technology, but not be so restrictive that the technology is obsolete before it can be installed.

Chapter One

INTRODUCTION

BACKGROUND OF THE PROBLEM

The last two decades have brought dynamic changes in the way we collect, use, and disseminate information. During that time, we have seen the growth of the use of computers into almost all facets of our business lives. We have seen an evolution of the computer environment from large circuitry to micro-technology. This evolution caused Booz, Allen & Hamilton, Inc., to compare the information resources environment in the 1960's and the 1980's. They characterized the early 1960's environment as follows:

- Highly centralized processing power
- Systems costs dominated by hardware costs
- Low power languages/user skill requirements high
- Highly centralized operation and data management
- System design strategy: maximize machine efficiency
- Management control strategy: interdict the purchase of mainframe computers (1:5)

Booz, Allen & Hamilton, Inc., contrasted the 1960's environment with the 1980's by describing the 1980's as follows:

- Distributed processing power
- Hardware costs rapidly declining: systems costs soon to be dominated by software costs
- Higher order languages/user skill requirements low
- Distributed ownership, operation, and data management
- System design strategy: strike a new balance between machine efficiency and system effectiveness
- Management control strategy: control the growth of the full range of information resources (1:6)

This comparison shows that the advances of technology over the past 20 years have caused managers to change their philosophy and approach when looking at the resources used to manipulate information. The 96th Congress of the United States recognized the change and enacted Public Law 96-511, commonly referred to as the Paperwork Reduction Act of 1980. This Act includes many statutes, but the main thrust is that it directs Federal agencies

to view information as a resource just as they view money, materiel, and manpower (4:2812-2815). Thus, the Act has spawned a term that has become common throughout the Federal Government: information resources management (IRM). IRM was defined by the National Bureau of Standards Panel on Standards and Controls for IRM meeting in October 1981 as

> whatever policy, action, or procedure concerning information (both automated or non-automated) which management establishes that serves the overall current and future needs of the enterprise. Such policies, etc., would include considerations of availability, timeliness, accuracy, integrity, privacy, security, auditability, ownership, use and cost-effectiveness (2:2-11 - 2-12).

Viewing information as a resource has caused Federal agencies to reassess the way they have managed information in the past. For the Air Force, this has meant reassessing the way it has handled information under three very distinct disciplines - automatic data processing, telecommunications, and administration. The reassessment resulted in a merging of disciplines at the Air Staff when, on 1 June 1983, the new Assistant Chief of Staff for Information Systems was formed. This organization is "responsible to the Chief of Staff of the Air Force for providing USAF policy, guidance, planning, programming, budgeting, and oversight for information systems" (5:Attachment 2). They have written a new regulation, Air Force Regulation 700-1, entitled Managing Air Force Information Systems, which "establishes policy, objectives, and responsibilities for managing Air Force Information Systems" (3:1).

OBJECTIVES OF THIS STUDY

In this paper, the author will review the way in which the Air Force plans to implement information systems. He will use his own experiences in implementing an information system at the Air Staff and by assisting with the initial actions to develop a similar system at the Air Command and Staff College (ACSC) to outline the steps one must follow to implement an information system in the Air Force. He will then conclude by evaluating the adequacy and applicability of current guidance. Thus, the paper will not only provide feedback to the Air Staff on the appropriateness of their IRM guidance, but it will also help others trying to implement an automated information system in preparing for some of the challenges ahead of them.

ORGANIZATION OF THE STUDY

The paper will explain the step-by-step procedures to follow in implementing an information system. The first step will ex-

plain how an organization gets started. This includes assignment of responsibility and the steps the office of primary responsibility must follow to garner support. The second step is to explain how requirements are determined and documented to use in developing the information system plan - the third step in the process. The fourth step will describe how the plan should be implemented and how feedback should be obtained. Finally, the paper will evaluate current Air Force guidance and procedures and recommend appropriate changes to this guidance to meet the future challenges in implementing automated information systems.

Chapter Two

GETTING STARTED

WHO'S IN CHARGE?

The first problem that confronts an organization that takes on the task of implementing an automated information system is to decide who should be the implementer. The natural tendency is to find someone who is technically trained - a data automator, telecommunicator, or administrator - and put them in charge. Many times that is a mistake! What is needed is an individual who can bridge the gap between the future user of the system and the technocrat who is going to help get it. The technically trained sometimes have difficulty communicating with the user.

> Communications had ground to a halt between the data processing (DP) department and the outside world. In fact, one senior-level executive complained, "Those people are nuts! They live in their own little world and rhapsodize to each other about bits, bytes and MIPs." [millions of instructions per second] (10:24)

The future user does not care about all that technical "mumbo-jumbo". The user wants a system that helps do the job regardless of what it technically entails.

Therefore, the head of the organization should select an individual who understands the organization from the users' perspective and who also has the training or interest to understand the technical jargon. "Cultivating the ability to communicate to the non-DP manager in his own language is one of the...guidelines for success..." (10:25). The person in charge of implementing the system must have the kind of personality that allows him to communicate readily and easily with the users. This will be critical downstream when the implementation phase begins.

The organization head has two very important decisions to make at the outset. The first is who should be responsible for implementing the system, i.e., the person of primary responsibility - the implementer. The second decision is where that individual should reside in the organization. Hopefully, the organization head can find the right individual within the organization, but it may be necessary to bring someone in from outside.

Going outside the organization has its advantages and disadvantages. The advantages are that the individual found might be more qualified, and they have a fresh perspective coming in, i.e., no preconceived biases. The disadvantage is that they do not have knowledge of the internal workings of the organization. Thus, they are more prone to making mistakes early in the process, and the learning curve required to become familiar with the organization may delay the development effort. However, it is more important to get a quality system than to get it quickly, so an extensive effort should be made to get the most qualified person no matter what the source.

Once the individual is selected, the next decision is where to assign this implementer. Since the individual will be implementing change and enacting a system that crosses all elements of the organization, the organization head should place him on his immediate staff, reporting directly to him. There are several reasons for doing this. The fact that the new system will change the way the organization does business will lead to controversy. People resist change. The implementer will be fighting an uphill battle if he does not have the strong support of the head of the organization. Therefore, it must be clear from the outset that the implementer works directly for the organization head, has the boss' total support, and has complete autonomy to cross suborganizational lines. This also gives the implementer quick access to the boss should any resistance at lower levels arise.

The author has had experience in this area. When he was implementing a system at the Air Staff, he was assigned to a subelement of the overall organization. Although the author tried constantly to treat each subelement equally, those in other subelements consistently accused him of showing favoritism to the subelement he was assigned to. He also met resistance from members of other subelements because he was not viewed as having their total interests in mind. Although the author went out of his way by compensating in favor of the other subelements, the resistance and controversy would have been eliminated if he had been a member of the direct staff of the organization head.

Another office at the Air Staff experienced similar difficulty. The office of the Air Staff Information Management System (ASIMS) was originally organized as a division under the Director of Administration. The ASIMS office was responsible for implementing an information system linking together the total Air Staff. This office had great difficulty getting the support it needed from the other deputy chiefs of staff. It became so cumbersome that the office had to be moved directly under the Assistant Vice Chief of Staff of the Air Force, the individual who heads the Air Staff. After this change was made, the ASIMS

office had the recognized support at the top needed to make it an effective organization. The other deputy chief of staff organizations quickly became more cooperative.

At Air Command and Staff College (ACSC), the same mistake is being made. The individual assigned responsibility for implementing the information system works in the Directorate of Curriculum. Although the ACSC Commandant strongly supports the system, as the development progresses through its various stages, the implementer will experience unnecessary difficulty if he does not work directly for the Commandant. Although it may seem like a minor thing in a mature organization, many problems and barriers can be overcome if the organization head locates the implementer properly within the organizational structure.

THE INFORMATION SYSTEM TEAM

Once the system implementer is assigned, he needs to form the information system team. The team should consist of a representative from each of the major subelements of the organization, e.g., each of the directorates of ACSC. Again, care must be taken in selecting the team members. They should be individuals who understand the internal workings of their element of the organization, who support change that improves the organization, and who are willing to assist the implementer and the members of their element in implementing the system.

> Ron Mead, a human factors specialist with the US Office of Personnel Management,...claimed that as many as 40 percent of all functionally sound office automation systems fail to provide the expected benefits because of a lack of cooperation from users...Mead said users' negative attitudes can often be partially attributed to office automation planning teams. These teams often alienate users by intimidating them with jargon, he explained, or by ignoring them altogether.
>
> . . . . . .
>
> To overcome user resistance, office automation teams must improve teamwork, involve users in the decision-making process and help make them break their fears about automation. (6:82)

Since assignment to the information system team will probably be an additional duty, other factors to consider when selecting members are the restrictiveness of their primary duties, the amount of time remaining on their assignment to the organization, and their training, experience, and interests. The individuals selected must be motivated to participate aggressively on the team.

> Team organization should be handled on two levels...The broad decisions can be made by a task force representing every segment of the organization likely to be affected

by office automation. More specific areas are dealt with by small committees. In addition, the team can encourage and help form user groups throughout the organization to ease the transition. (7:82-84)

After the team is formed, the next step is to determine existing capabilities and possible action that has already been completed.

WHERE ARE WE NOW?

The first action to be taken by the implementer and the information system team is determining what has already been done. Few Air Force organizations lack at least some type of automated information support. Most organizations have either word processing equipment, microcomputers, or a remote terminal that accesses a larger computer. Since these devices and capabilities will need to be incorporated into the total system, the team needs to start out understanding what these devices are, what they do, and what requirements drove their procurement and installation. The first step, then, is to conduct a survey of the numbers and types of devices already installed by organizational subelement.

The next step in determining where we are now is to gather organizational information. The author has found it helpful to obtain a mission statement for each subelement so all the team members understand the functions of each of the elements. Another useful tool is an organizational chart with authorized personnel numbers by grade for each subelement. Since the information system will include devices to be used by these personnel, the number required depends on authorized manning and where these personnel are located. Therefore, a floor plan of the buildings assigned to the organization containing a synopsis of which elements are housed where will be needed.

In both systems that the author worked on, an Air Force Regulation 4-2 word processing survey had been conducted within the organizations, and word processing equipment was installed or ordered. The word processing survey requires that typists record the number of lines of information typed during a given period, indicating the source and format output for the information as well as its destination. The author has found that this information is quite helpful to the information system team in understanding the information flow within the organization. If this has not been done, the team needs to conduct an AFR 4-2 or similar survey to determine this information. After this information is gathered, the team needs to step back and look at their organization from a bigger perspective.

OUTSIDE FACTORS

The information system team must recognize that their organization does not function in total isolation of other organizations. Therefore, one of the initial taskings of the team is to determine whether their information system needs to interface with or be a part of another information system. And, if it does, have arrangements been made to maximize cross-flow of information so the parts can be integrated at a later date?

At the Air Staff, the author was implementing a system for one of the deputy chiefs of staff. He recognized that most of the information generated and received in the DCS came from within. However, there was a requirement to be able to interface with the other DCS's information systems as well as those at the major air command level. Therefore, as implementer of the DCS's information system, he also needed to ensure that his system would fit with the others. To do this, he became a member of the Air Staff Information Management System team and used that forum to insure that his system was going to fit within the overall Air Staff system.

At Air Command and Staff College, the same approach must be followed. The ACSC information system team must insure that their system fits into any Air University plans as well as plans by the Air Force Data Systems Design Center to provide automated support for Air University. Additionally, as the Air Staff develops the "Air Force Information Systems Architecture" (11:7) and the necessary standards to support that architecture, the ACSC team must insure that their plans will generate a system that meets the standards and fits the architecture. If this information is not available, ACSC has two options.

The first option is to wait for the architecture and standards to be established. This is probably not a good option for it will delay the ACSC system for an undetermined period of time. The second option is to implement the ACSC system without this information, but incorporate as much flexibility as possible into the system so that the difficulty and cost involved in meeting the standards and fitting the architecture at a later date are minimized. An example of a standard that will be forthcoming is the Department of Defense's Ada programming language.

> Because each service branch maintains hundreds of different types of computers, each also must cope with a great variety of languages.
> To resolve this confusion, DOD decided to adopt one language that would enable the equipment of all four branches to communicate. More important, a single language would make it easier to manage the millions of lines of program

code that each service uses to run its hardware.

. . . . . .

The result: a very powerful, high-level language that avoids the pitfalls that make existing languages hard to manage and maintain. (6:127)

ACSC does not want to wait for this language development to meet its applications nor does it want to pay the price in today's market to have the code written in Ada to meet its needs. What ACSC does need to do is be aware of this future standard and design into its information system the flexibility to incorporate Ada at a later date.

Now that the information system team is formed and chaired by the system implementer and it has gathered the appropriate background information and considered the outside factors, it is time to start the planning process. The first step of the planning process is determining what the requirements are.

Chapter Three

REQUIREMENTS

DETERMINING THE REQUIREMENT

Determining the requirement is probably the most difficult task of implementing automated information systems. It does not appear that it should be that difficult. We now have an information system team. Let its members go ask the individuals assigned to the organization what they need in the area of information system support. They will probably get a lot of blank stares.

> As the...terminal-based systems evolve, they will become a natural part of the life of a manager or professional in the same way that they are now a part of the operational life of an enterprise. (9:33)

People have trouble explaining what they need when the system is going to change the way they do business. It is hard to express a requirement for something when one does not understand what that something is. The information system team is therefore confronted with a problem. How do they develop the requirement?

The most logical thing to do is educate the future users on what capabilities are available in the market place and then let them decide if they need those capabilities and, if so, how they would use them. The author used demonstrations by commercial vendors of their products and attendance at trade shows to educate the prospective users on the capabilities of available commercial devices. He followed this up with a questionaire asking what features would be required and/or desired in an information system and how they would be used by the organization.

> Most system users are driven by a motivating application, a requirement that acts as the proximate cause for acquiring and using a system. While they may have use for additional capabilities and may in fact use them once the system is deployed, the motivating application dominates all other considerations. The user will want the very best system for this application that he can get. Other considerations, including the nature and accessibility of secondary applications,

pale by comparison (8:42).

Therefore, the information system team must determine what primary application the users require first. The initial requirement of the system is the combination of hardware and software that provides that application. Then, the team must decide on the second most important application, then the third, then the fourth, etc. This information provides a good starting point for the development of the information system plan.

AN EVOLUTIONARY PROCESS

Before the team presses on to develop the plan, they need to consider a couple of other factors. The most important one is the availability of money to fund the system. The author's experience is that money provides an immediate restriction on how the plan is developed. In both cases that the author has been involved with, there was no initial money programmed or available to fund the system. It was possible to reprogram some money or to use funds like productivity improvement funds to start the system. However, a plan without the supporting funds to execute it has little value. Therefore, as the plan is developed, it must be done from the realistic perspective that funds are going to be a limiting factor in the early stages and maybe throughout the entire system implementation.

A second factor for the team to consider is that technology is advancing so rapidly in the area of information systems that technological obsolescence must be a concern. The plan should call for an evolutionary development of the system rather than a revolutionary change. The plan should allow for the necessary flexibility to take advantage of new technology as it becomes available. This means that the total system should be modular so that new enhancements can be added and outdated elements deleted without significantly degrading the performance of the system. Also, individual elements should be procured with options for upgrading or expanding their capabilities at a later date.

Another reason for the evolutionary approach is it allows the organization to gradually transition into the new way of conducting business instead of making an abrupt change that disrupts the organization's mission effectiveness. When dramatically changing the work environment, it is smart to ease into the change gradually so that individuals have a chance to adjust to the new conditions. In addition, the training required for using the new technology will be quite extensive. Productivity will be degraded less if the training can be spread over a longer period, thereby involving less people at any one time.

Combining the requirement to meet specific applications, the probable restriction on funding, the rapidly changing technology, and the organizational transition that will occur, an evolutionary process of requirements determination and systems development becomes a sound management approach. In other words, the information system team should not try to lock in the requirements for the total system. They should develop the requirements based on the applications needed today, but they should remain flexible knowing that the requirements will change. A logical approach is to develop specific requirements for priority applications with fairly general requirements for applications that will be developed later.

Armed with the requirements, the information system team should be ready to begin preparation of the system plan.

Chapter Four

THE PLAN

LONG RANGE GOALS

The information system team should begin the development of the organization's information system plan by establishing some long range goals. For the purpose of information systems with their rapidly changing technology, these goals should be directed towards, but not limited to, five years from the plan inception. They should include all the applications identified during the requirements determination process. These goals should project where the information system team would have the organization evolve to in the foreseeable future, eclipsing, if necessary, both monetary and technological limitations.

At the Air Staff, the author developed long range goals that included both quantities of devices and capabilities desired. The goal was to have one work station for at least every two authorized personnel at the five-year point. Long range capability goals included on-line storage and retrieval of all unclassified information used by the DCS and electronic coordination of documents throughout the organization. There were other long range goals that were included in the plan but were not defined as five-year goals because they depended on technological developments or actions by outside agencies. These included such things as storage and retrieval of classified and unclassified information on the same network - a capability that required development of new technology to meet the security requirements, and electronic coordination of information across the total Air Staff - a capability that the ASIMS office had to develop. These goals were included in the plan to insure that the DCS system remained flexible enough to incorporate these capabilities when they became available.

THE ARCHITECTURE

Once the information system team has developed their long range goals, they must construct an architecture on paper that displays how they view the individual pieces fitting together. This architecture should be designed from both the hardware and networking standpoint and the organization's information flow. The architecture is a graphic projection of how the various com-

puters, peripherals, networks, and applications would be configured to fulfill long range goals.

> We will get to the office of the future by installing particular solutions to particular problems, until we wake up one day and find ourselves with a new working environment. System planners must design their ultimate office architectures, but these architectures will be implemented in an indirect fashion. The key to success is ensuring that individual solutions to immediate problems adhere to an overall architectural vision, so that the end product is consistent, rather than fragmented (8:46).

The architecture serves as a roadmap to assist the team in insuring that each element of the system fits the total. At the Air Staff, the author's architecture included word processing equipment, personal computers, mini-computers, mainframes, terminals, printers, optical character recognition devices, electronic typewriters, automated storage and retrieval systems, local area networks, automated phone systems, teleconferencing systems, etc. Although some of these items and the applications they were to address were not near term goals, they were included in the architectural design to insure that each part would fit when finally implemented.

INTERIM PHASES

After developing the long range goals and constructing the architectural roadmap, the team is ready to decide which requirements they wish to fulfill and when. Since the information system is being developed in an evolutionary manner, the team must decide how it wants to phase the development process based on a logical review of money available, the urgency of the various requirements, and an intelligent approach for constructing the system.

At the Air Staff, the team decided that providing automated support to the administrative support personnel who spent more than half of their time typing (roughly 60% of the secretaries) was the most urgent requirement. So, word processing devices were procured for them during Phase I. Phase I also included procurement of a sampling of minimum-capable electronic typewriters for those administrative support personnel who did not type half of the time. Professional staff work stations were also procured for one division (roughly five percent of the professional work force). Phase I got the system started within the funding limitations, met the most critical need, and allowed for prototyping of some of the automated capabilities to determine if the quantities and capabilities were appropriate to meet

the requirements. Built into the plan were checkpoints between phases to allow for review before proceeding to the next phase.

CHECKPOINTS

Checkpoints are pre-planned pauses where the information system team stops to evaluate the effectiveness of the systematic evolutionary process up to that point before a decision is made to continue on with the phase. These evaluations can be done by the team or an outside agency, whichever is deemed more appropriate. However, these decisions should be made up front and incorporated into the plan.

At the Air Staff, the team conducted the evaluation after Phase I and found that the electronic typewriters with minimum capability were not adequate to meet the needs of the secretaries they were designed for. Thus, the team decided to upgrade these devices to enhance their features and procure similarly enhanced devices for the remainder of the secretaries during Phase II. The sampling of the professional work stations proved their adequacy, and they were likewise procured for the rest of the professional staff. The team required an outside agency to conduct the evaluation after Phase II to get an unbiased evaluation of the system development up to that point and to approve the implementation of Phase III.

GETTING APPROVAL

After the information system team completes the plan with its long range goals, its interim phases, and an explanation of the checkpoints and who will do the evaluations, it is time to get approval for the plan from the organization head and the chiefs of the various organizational subelements. The best approach for accomplishing this is to give these individuals a copy of the plan in advance and then have all in attendance at a briefing of the plan to the organization head. This forum allows for open discussion of the plan and reiterates the boss' support for the implementation of the system. The system implementer should have each team member coordinate the plan with their respective subelement chief and resolve any problems prior to the meeting. The success of the system implementation depends on a consensus that the plan is sound and that all elements of the organization agree to support it. After this is accomplished, the team is ready to begin the implementation process.

Chapter Five

IMPLEMENTATION

MAKING IT HAPPEN

The implementation process begins by implementing the first phase of the information system team's plan. Now is the time when the implementer feels like he must become a technical expert, a supply officer, a contracting officer, and a budgeting officer all rolled into one. To accomplish this monumental task, he must seek the support of each of these disciplines and comply with all their regulations.

First, he must get approval from the appropriate technical support function. If he is procuring word processing equipment, he must comply with the 4-series regulations. If it is communications equipment, then he uses the 100-series regulations. If it is automated data processing equipment, he must comply with the 300-series regulations. In the future, hopefully, the 700-series regulations will consolidate the three other technical series into one series. However, today, the implementer of an automated information system must comply with each one of these since the system probably includes elements of all of them.

The implementer should meet with the appropriate technical support personnel and draft a technical specification of the capabilities needed in the items to be procured. The specification is used in the documentation to obtain approval from the technical support function and also in the scope of work used by the contracting officer. The technical expert should provide the wording necessary to communicate the capabilities required to the potential vendor in the technical jargon used by that industry. The technical specification must also include training (initial and follow-on), electrical requirements, environmental factors (temperature and humidity), peripheral equipment needed, etc. In addition, the technical expert should assist the implementer in preparing the other documentation required by the technical regulations to obtain approval to proceed with the procurement. Once the technical approval is obtained, the implementer proceeds to the next support function.

The implementer then takes the technical information with the appropriate supply requisition to the supply officer. The supply

officer processes the requisition and advises on initial supplies needed to go with the procurement as well as establishing stock levels to meet recurring demands. The supply officer and technical expert should advise the implementer on an appropriate maintenance plan to include with the requisition.

Next, the implementer goes to the budgeting officer to get money appropriated to procure the item. The lease versus buy option is discussed here and many times depends on the funds the budget officer has available. Since procurement (buy) money is normally at a premium, the decision will probably be made to lease with options to buy. After the supply and budget officers have approved the requisition, it goes to the contracting officer. At this level, a whole different set of guidance comes into play. To get approval to buy an information system element under the new 700-series regulations will require computation of life-cycle costing of several alternatives. The implementer would naturally assume after completing this analysis that the least cost alternative that meets his needs would be the one procured. Well, the contracting officer applies his regulations now, and they may force a competitive procurement, a small business set aside, or some other method of acquisition that obliterates the life-cycle costing analysis.

The bottom line is that to implement an information system in the Air Force today requires the implementer to comply with at least six or seven different series of regulations. Each series is very complicated and requires a formal approval process before the implementer can proceed to the next series. This forces the implementer to become knowledgeable in all these areas and to monitor a myriad of documents daily. A successful implementer must garner the support of each of the functional experts very early in the implementation process if he wants to avoid frustration, embarrassment, and system development delays later on.

HAND HOLDING

Assuming that the implementer has closed the procurement loop and the devices are delivered, now comes one of the most critical times for the organization and the implementation of its automated information system. The vendor who is awarded the contract should install the system and provide initial training. That implies that the implementer's job is through. Nothing could be farther from the truth. The implementer has to schedule delivery and training. This normally entails insuring that the organization is ready to receive the equipment and that the environment, electrical outlets, and furniture are positioned to install the devices. The implementer also has to arrange a room for training and insure that the appropriate personnel are allowed to attend the training. Many times, training is accomplished

using the devices that were just delivered, so they have to be put in a training room first and then moved to their operational environment. Another option is for the vendor to conduct training at the vendor location. This means that organizational personnel must report to the vendor's location. This is not always a desirable arrangement. Therefore, it is best to cover the training location and what devices will be used for training in the technical specifications and the ensuing contract.

After initial training, the vendor is usually required to provide follow-on assistance to the trainees. The vendors use what they call marketing support representatives for this purpose. The author recommends that the contract specify that the marketing support representative spend many hours within the user organization during the first few weeks after initial training. This is the period of the peak of the learning curve, and the trainees will require much hand holding during this period. When the author was going through this phase at the Air Staff, he dedicated an Air Force resource to be the expert user of the new device and to be available to answer any questions when the marketing support representative was not around. This is the period of greatest frustration for the user. They are using an unfamiliar system that is forcing them to change the way they normally work. It is critical that this period be made as easy as possible for the user.

GETTING FEEDBACK

During the early stages of the implementation phase of the information system, the implementer must not only hold the users' hands, but he must also get as much feedback as possible from the users and the organizational chiefs. The author found two effective means for getting feedback. The first was to hold bi-weekly users' meetings during the first few months after installation of a new device. These meetings provided an opportunity for users to share good ideas and difficulties they were having. The discussion at these meetings provided the feedback needed by the implementer to insure the devices were fulfilling their stated purpose. The second means used by the author was to make weekly trips to each of the duty sections where the devices were, answering questions and asking the chiefs and users what successes or failures they were having as a result of the information system elements.

Feedback obtained in this fashion provides a sound basis on which to evaluate the effectiveness of the devices and the system to use at checkpoints in deciding whether to continue with the next phase of the plan. The implementer should document difficulties and bring them up to the information system team for resolution. After each phase of the implementation plan is completed and evaluated, the implementer should press on and initiate the next phase.

FLEXIBILITY IS THE KEY

The evolutionary process described in Chapter Three is designed to maintain flexibility throughout the system implementation. Therefore, the biggest mistake an implementer could make would be to stick rigidly to the initial plan. Each subsequent phase should be modified to take advantage of the lessons learned during the implementation of the previous phase and its subsequent evaluation. The implementer should also remain cognizant of advances in technology and changes in the organization environment.

> The strategy is both organizational and technological in nature. These two driving forces must be synchronous for optimum benefits and flexible enough to respond to a realistic spectrum of business possibilities. A "do it, fix it, try it" attitude is ingrained in this strategy (12:62).

Industry has learned this lesson. The Air Force can likewise implement successful information systems if it is willing to transition from a revolutionary process to an evolutionary one.

Chapter Six

CONCLUSIONS

STEP-BY-STEP PROCEDURES

This paper has outlined the step-by-step procedures that should be used by any organization in implementing automated information systems. The first step must be made by the head of the organization when he decides who the individual should be that implements the system and where that individual should reside in the organization. Once the implementer is appointed, he must organize the information systems team. The team then gathers information on existing capabilities and additional requirements. This information is used to develop the system plan which must be approved by the organization head before the full-scale phased implementation can begin. This procedure should result in the successful implementation of an automated information system.

RECOMMENDATIONS

The new Assistant Chief of Staff for Information System at the Air Staff, Major General Gerald L. Prather, has the unenviable task of providing new policy to govern Air Force execution of information systems implementation in the 1980's environment.

> This requires a shift from centrally oriented information services, however, to more supportive decentralized systems responsibilities, and with it, the risks of "future shock" mishaps and degradation of internal controls. A controlled outward migration of systems resources and responsibilities is necessary, centered around an explicit systems strategy that assures cost-effective utilization and conscious risk management (12:62).

To assist the using community during this evolving period, the Air Staff should develop a methodology that assists the user in determining their applications requirements in a relatively simple fashion. General Prather stated, "We're pursuing possible alternatives that will allow us to streamline and standardize the requirements definition process and speed up the fielding of

vital information systems." (10:7) This statement indicates the goal. The Air Staff should task Air Force Systems Command to use their experiences and those of industry to develop this methodology.

The second recommendation is to insure that the new 700-series regulations streamline the approval and procurement process. These regulations must consolidate the procedures currently outlined in the 4-, 100-, and 300-series regulations into one simple approval process. They must also consider the supply, budgeting, and procurement regulations and align the documents required for technical approval with the documents required for procurement. Users should be allowed to complete one type of document to accomplish the total process.

The third recommendation for the Air Staff is to decentralize the controls on information system elements. Industry has recognized that their data processing departments are not going to control the micro-technology available to users today. The Air Force needs to recognize this fact and provide intelligent guidance to users instead of tight controls.

The fourth recommendation is to develop a handbook or pamphlet to guide users in the procedures to follow in procuring system elements. The handbook could include the steps the author has outlined in the appendix to this paper. It should also alert the user to other factors to consider as well as potential pitfalls that might be encountered. The user community needs something that explains how to go about implementing an information system.

The fifth and final recommendation is to consider relocating data automaters in the functional areas next to the users. As the new technology is incorporated into the user environment, more applications will be utilized on smaller systems. To maximize the benefit from the information system technology, computer programmers will be needed at the user level instead of in central agencies. An initial step to prototype this approach within an organization would prove the advantages and disadvantages.

The Air Force has taken the correct step in forming the Assistant Chief of Staff for Information Systems at the Air Staff. Now, this organization must exert some creative leadership so that the rest of the Air Force can benefit from the information systems approach. The gains can be tremendous if old ways can be forgotten, and new, logical means are found to streamline the implementation and management of this evolving environment.

BIBLIOGRAPHY

A. REFERENCES CITED

Briefings

1. Booz, Allen & Hamilton, Inc. A Perspective on Information Resources Management. 12 June 1981.

Official Documents

2. Air Force Office of Information Resources Management. Information Resources Management Planning Guidance. Washington, DC, 29 January 1982.

3. Air Force Regulation 700-1 (Draft). Managing Air Force Information Systems. HQ USAF, Washington, DC. 9 December 1983.

4. 96th Congress of the United States. Public Law 96-511. 94 Statute. Washington, DC, 11 December 1980.

5. Prather, Gerald L., Major General, USAF. Creation of the HQ USAF Assistant Chief of Staff, Information Systems (AF/SI). HQ USAF/SI Letter with attachments. Washington, DC, 1 June 1983.

Articles and Periodicals

6. Campt, David W. "DOD's Ada May Find Support Throughout the Industry," Data Communications, January 1984, pp. 127-130.

7. Freedman, David H. "Team Up to Plan Office Automation," Infosystems, February 1984, pp. 82-84.

8. Hammer, Michael. "In Focus - The OA Mirage," Datamation, February 1984, pp. 36-46.

9. Kruse, Andreas H. "Organization Change Looms Inevitably," Data Management, February 1984, pp. 33-34.

CONTINUED

10. McKibbin, Wendy Lea. "You've Got to Sell 'Em," Infosystems, January 1984, pp. 24-28.

11. Prather, Gerald L., Major General, USAF. "AF/SI Insights," AFRP 700-1 Information Systems, 17 October 1983, pp. 7-8.

12. Winski, Donald T. "A Systems Strategy: In Search of Excellence," Infosystems, January 1984, pp. 62-66.

B. RELATED SOURCES

Books

McCabe, Helen M., and Estelle L. Popham. Word Processing: A Systems Approach to the Office. New York: Harcourt Bruce Jovanovich, Inc., 1977.

Official Documents

National Research Council. Modernizing the U.S. Air Force Base Level Automation System, A Report to the U.S. Air Force. Washington, DC: National Academy Press, 1981.

Articles and Periodicals

"A Little Training Can Go a Long Way in Info Centers," Data Management, February 1984, p. 32.

Brown, Gary D., and Donald H. Sefton. "The Micro vs. the Applications Logjam," Datamation, January 1984, pp. 96-104.

Chin, Kathy. "The Key to Mainframe Communications," InfoWorld, 12 March 1984, pp. 24-32.

Freedman, David H. "Is the Micro-Mainframe Link Connecting with MIS?" Infosystems, February 1984, pp. 28-34.

Friis, M. William. "Putting Information Systems Theory into Practice," Infosystems, February 1984, pp. 104-106.

CONTINUED

Gish, James. "Improving MIS/DP Productivity," Infosystems, February 1984, pp. 86-87.

"Overcoming Resistance," Infosystems, February 1984, p. 82.

Pantages, Angeline. "Office Automation. What is it?" Working Woman, November 1980, pp. 10-27.

Petruzzelli, Vito G. "The Info Center - A Powerful Tool for Modern Times," Data Management, February 1984, pp. 20-21.

Warfel, George. "Signature Dynamics: The Coming Identification Method," Data Processing & Communications Security, September/October 1983, pp. 19-21.

Weber, Austin. "Advice to Would-Be CEOs from a Former DP Manager," Data Management, January 1984, p. 29.

Zientara, Marguerite. "DP Departments to Change Roles," InfoWorld, 12 March 1984, p. 27.

APPENDIX

PROCEDURES FOR IMPLEMENTING INFORMATION SYSTEMS

1. Getting Started

    a. Appoint system implementer.
    b. Locate implementer in organization.
    c. Establish information system team.
    d. Survey existing capabilities - automated devices on-hand or on-order.
    e. Obtain organizational background information - missions, manpower, facilities, and related information system documents.
    f. Be aware of other information systems you may need to interface with.

2. Requirements

    a. Determine applications required.
    b. Prioritize these applications.

3. The Plan

    a. Develop long range goals.
    b. Design the architecture.
    c. Decide on the interim phases.
    d. Pre-plan checkpoints and decide who will evaluate at each point.
    e. Brief plan to obtain approval.

4. Implementation

    a. Prepare appropriate documents for procurement.
    b. Obtain technical support function approval.
    c. Obtain funding.
    d. Requisition through supply.
    e. Procure through the contracting office.
    f. Monitor installation and training.
    g. Provide assistance to users.
    h. Get feedback.
    i. Evaluate effectiveness of implemented phases.
    j. Repeat implementation procedures for next phase.