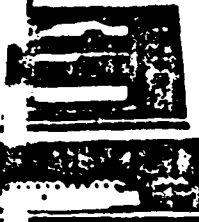


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U.S. Army Institute for Research
in Management Information,
Communications and Computer Sciences

AIRMICS

INFORMATION CENTER
MODEL SITE EVALUATION

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PREFACE

The Army Institute for Research in Management Information, Communications, and Computer Sciences (AIRMICS) is the research arm of the U. S. Army Information Systems Engineering Command (ISEC). AIRMICS is currently conducting research into the implementation and operation of Information Centers (ICs), both in government and in private industry. Under this task, under the sponsorship of the U. S. Army Information Systems Command, and directed by AIRMICS, a series of orientation and evaluation visits were made at six U. S. sites. The six sites were: Fort Stewart, Fort Monroe, White Sands Missile Range, Fort Hood, Rock Island Arsenal, and Fort Ord. The purpose of the project was to determine the services provided at the sites and the strategies used at the sites to implement the services. The goal was to provide: (1) an analysis of the way that IC functions were being performed at the sites; (2) an update to the draft Planning and Implementation Guide; and (3) a revised set of IC Orientation viewgraphs for use by installations in the startup phase of IC implementation. The results of the site visits are presented in this document.

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MODEL SITE EVALUATION

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SECTION 1
PROJECT SUMMARY

1.1 PROJECT OVERVIEW

Task 10 was based on AIRMICS current research with respect to Information Centers (ICs) for the U.S. Army. This task consisted of four (4) major activities, (1) to develop and deliver an IC orientation briefing to six model sites, (2) to develop and conduct an IC evaluation of six model sites, (3) to collect feedback and incorporate that feedback into the IC Planning and Implementation Guide (IC P&I Guide), and (4) to collect data for an economic cost/benefit analysis of IC implementation strategies. Figure 1-1, IC Evaluation Project Work Flow, demonstrates the relationships between the project activities, while Figure 1-2, IC Evaluation Project Schedule, illustrates the time table for these activities. The objective of this study was to provide recommendations for strategies to successfully implement ICs in the U.S. Army.

Six model sites, U.S. Army installations with operating ICs, were specified by 7th Signal Command for inclusion in this project. The six sites were: Fort Stewart, Georgia; Fort Monroe, Virginia; White Sands Missile Range, New Mexico; Fort Hood, Texas; Rock Island, Illinois; and Ford Ord, California. Each site was visited twice, first for an orientation briefing, and second for collection of data during interviews. The second site visit took place approximately six to ten weeks after the first. ISN personnel were accompanied by representatives from AIRMICS, 7th Signal Command, and/or Information Systems Command (ISC) during both site visits. The schedule of visits is shown in Table 1-1, below.

=====

<u>SITE</u>	<u>DATES OF</u> <u>ORIENTATION</u> <u>SITE VISIT</u>	<u>DATES OF</u> <u>EVALUATION</u> <u>SITE VISIT</u>
Fort Stewart, GA	13 - 14 May;	08 - 10 July 1986
Fort Monroe, VA	15 - 16 May;	15 - 17 July 1986
White Sands Missile Range, NM	19 - 20 May;	22 - 24 July 1986
Fort Hood, TX	21 - 22 May;	29 - 31 July 1986
Rock Island Arsenal, IL	28 - 29 May;	05 - 07 August 1986
Fort Ord, CA	03 - 04 June;	12 - 14 August 1986

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SCHEDULE OF SITE VISITS

TABLE 1-1

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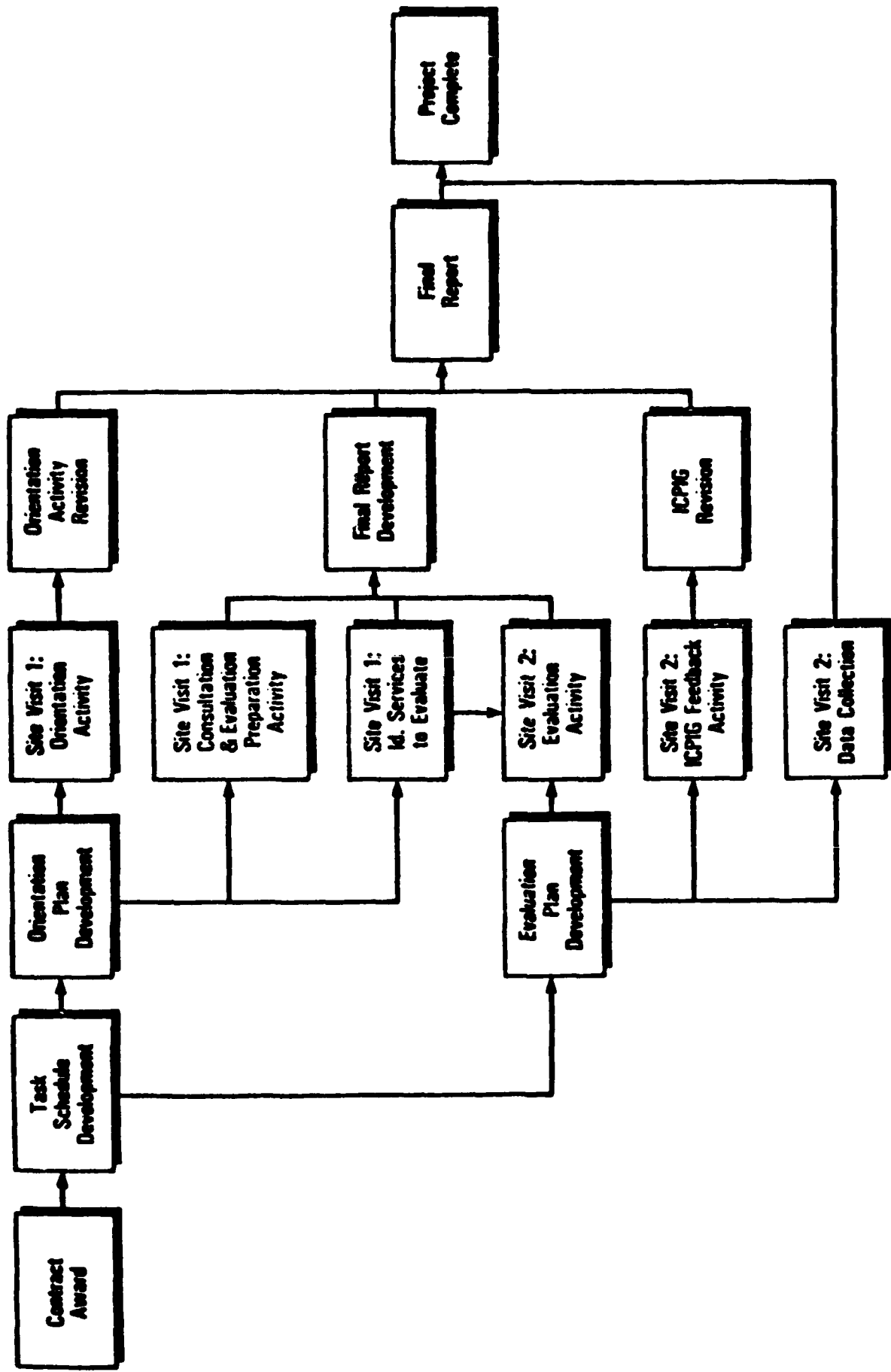


FIGURE 1-1 IC Evaluation Project Work Flow

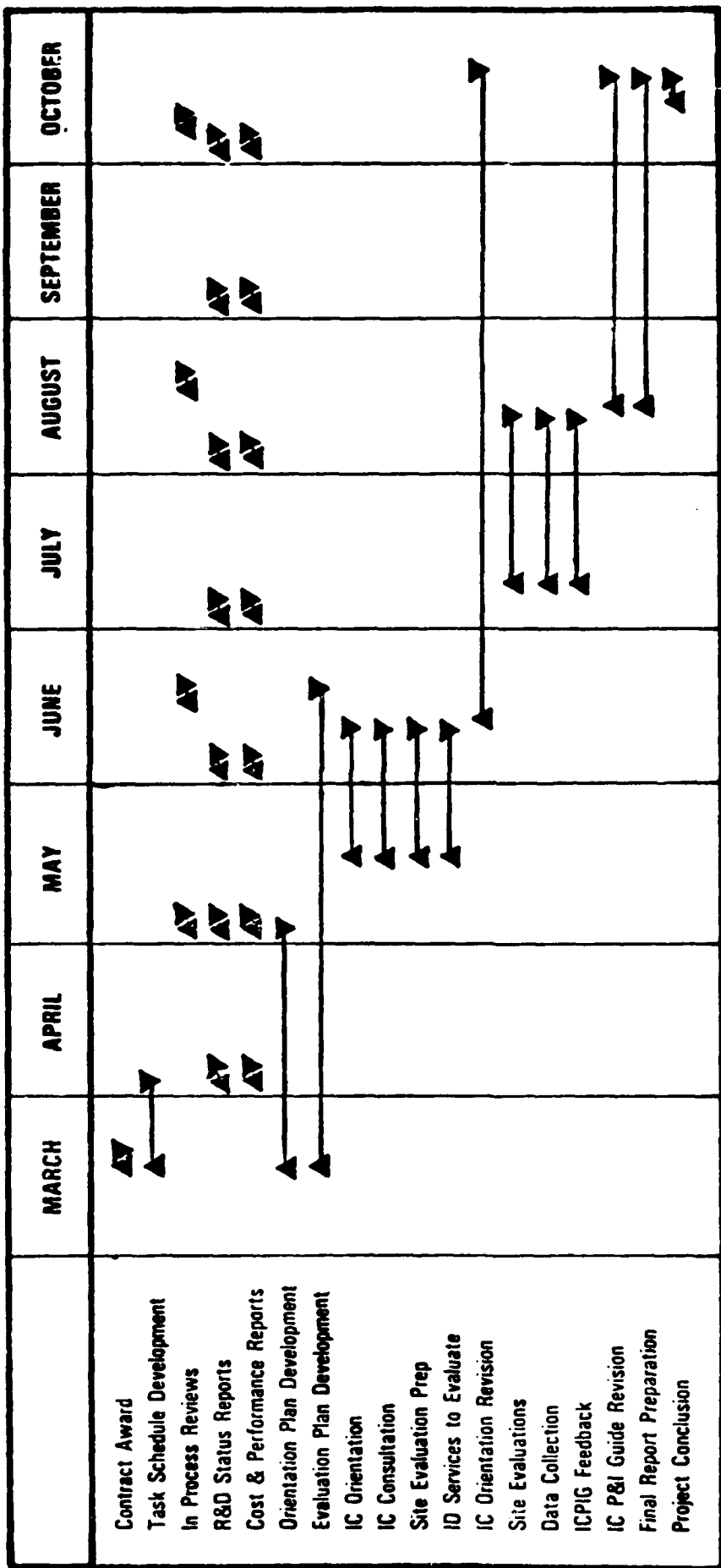


FIGURE 1-2 IC Evaluation Project Schedule

1.2 IC ORIENTATION

While the presentation of an IC orientation briefing was the focus of the first site visit, four additional activities were included: (1) ISN provided consultation and problem solving assistance to the staff of each IC during a problem solving workshop; (2) in addition, ISN met with the IC manager at each site to get an overview of the IC and to identify specific issues to be explored during the evaluation visit; (3) ISN also explained the procedures for the IC evaluation visit, and (4) ISN delivered requests for data for ISC economic analysis at some sites. The two-day site visit also included an in-briefing and out-briefing with the ISC commander of the installation.

1.2.1 Orientation Briefing

The original version of the orientation briefing was presented at the first In-Process Review (IPR) and revised based on comments and suggestions received at that time. The orientation presentation was subsequently revised based on model site response. The revised version is presented in Part C of this final report.

ISN conducted on-site orientations for each of the selected model sites. The IC orientation briefing is designed such that it will be suitable for use as a standard orientation for personnel responsible for the planning and operation of ICs in the U.S. Army. The IC orientation includes the philosophy and theory that forms the basis of the IC concept, and focuses heavily on practical "how to" information. Charts and sample forms are included for successfully planning, implementing, and operating an IC. The IC P&I Guide is referenced as a resource in the orientation briefing. A summary of the differences between the prototype briefing and the revised briefing are shown in Table 1-2.

The IC orientation briefing is designed in a modular format. Each module can be expanded or contracted depending on the needs of each specific audience. Because the orientation was given to installations that have operating ICs, the model site installations were given the opportunity to select topics of discussion, based on their particular needs and interests. The IC Concept, Module I, was discussed at each installation, as were three sections of Module II, Planning the IC: (1) conducting a needs assessment and analysis; (2) defining the IC mission, goals, and objectives; and (3) the organizational placement and interfaces of the IC. A representative from 7th Signal Command or ISC lead the discussion of organizational interfaces. The sites then were asked to choose topics of discussion from a list of topics from the remainder of Module II, and Modules III and IV. Table 1-3 summarizes the subjects chosen at each site. The orientation briefing concluded with a discussion, from Module IV, on the future directions of the IC.

PROTOTYPE	10/86 REVISION
90 VU-GRAPHS	85 VU-GRAPHS
CHANGE FROM:	CHANGE TO:
- Industry Case Studies	- Army ICs
- Hardware/Software/Data List	- Hardware/Software/Data Chart
- Support Desired List	- Support Needed Chart
- Industry Examples for Mission and Goals	- Army Examples for Mission and Goals
- Blank Work Sheets	- Completed Work Sheet Examples
- Section Titled: Document Planning Process and Implementation Plans	- Section Titled: Develop Strategic Plan
DELETED	ADDED
- Funding and Chargeback Topics	- SCEC Chart
- Characteristics of an Evolving Organization Section	
- Evolution of Services Section	
- Organization Support Structure Chart	
	EXPANDED
	- Section Titled: Need Assessment and Analysis
	- Government Classification Series Listings

SUMMARY OF REVISIONS
IC ORIENTATION BRIEFING

TABLE 1-2

Frequency of Response*	Discussion Topics	Sites Where Topic Discussed
15	Decide Service Options	Fort Stewart Fort Monroe Fort Hood Rock Island Ar. White Sands M.R.
9	Select and Train Staff	Fort Hood Fort Ord Fort Stewart
4	Facility Design and Site Preparation	Fort Hood
16	Establishing Operating Policies and Procedures	Rock Island Ar. Fort Ord
5	Implement and Evaluate Prototype IC	White Sands M.R.
3	Marketing	Fort Hood
10	Evaluation of IC Services and Operation	Fort Monroe Fort Ord

*Note: Frequency of Response indicates total number of participants selecting this discussion topic at all sites. Number of participants varied from site to site. Topics were selected for discussion at individual sites based on the frequency of response for the individual site only.

PLANNING, IMPLEMENTING, AND OPERATING THE INFORMATION CENTER

TOPICS FOR DISCUSSION

TABLE 1-3

1.2.2 Problem Solving Workshop

Each orientation briefing was followed by a problem solving workshop. The sites selected a problem for in-depth discussion from a list of major problems identified by ICs in industry. After all participants voted, the responses of each site were compared with the Army ICs visited to that point, and with the responses from industry. A summary of the ranking of problems is shown in Table 1-4. The sites then selected a topic for discussion, usually the problem identified most frequently by the majority of participants. The problem solving workshop followed this discussion. The handouts used in this workshop are reprinted in Appendix A.

The purpose of the workshop was to discuss, in a structured format, the problems that participants felt interfered with their ability to operate their IC at maximum efficiency and effectiveness. Normally the day-to-day demands of the IC prevent the staff from taking the time to look at the problems they are experiencing, analyze them, and find possible solutions. This workshop therefore served to provide an opportunity for the IC staff to discuss their individual situation. It was not the intent of this workshop to develop a specific solution to a problem, but rather to foster the concept that the IC can act in positive way to lessen the impact of their problem areas. Because of this focus, the idea generating process and discussion were considered more important in the workshop than a specific outcome. The participants did not complete all the work sheets at every site. The notes from the discussion were left with each site for follow-up discussion.

The problem that "demand for services exceeds capacity" was selected for discussion by four (4) sites: Fort Stewart, White Sands Missile Range, Fort Hood, and Fort Ord. Rock Island Arsenal chose to discuss "the Center's responsibilities have not been clearly defined"; while Fort Monroe's selection was "it has been hard to develop a staff with appropriate skills."

During their workshop Fort Stewart concentrated on the idea that developing self-sufficient users would help alleviate the "demand exceeds capacity" syndrome. Five techniques for developing user self-sufficiency were discussed in-depth: (1) provide training at different proficiency levels, and provide refresher training; (2) develop "super users" who can support their co-workers; (3) train supervisors who can support their subordinates; (4) encourage the use of product manuals as the first step in problem solving; and (5) encourage/require users to develop their own user manuals for specific products. The participants then evaluated these ideas using the criteria they judged most likely to ensure the success of the idea. Given staff limitations, and the participant's judgment regarding how easy it would be to sell the idea to the users, they selected two ideas for possible implementation: (1) develop "super users" who can support their co-workers; and (2) encourage the use of product manuals as the first step in problem solving.

Army Sites**	Industry*	Major Problems Faced By Information Centers
1	1	Demand for services exceed capacity
6	2	Users avoid developing their own systems
3	3	It has been hard to develop a staff with appropriate skills
6	3	Existing controls for user development are inadequate
4	5	User expectations about information center services are unrealistic
13	6	It has been difficult to obtain top management support
13	6	Procedures for software procurement are not well formed
9	6	Resistance exists in the DP department
16	6	Inappropriate applications are being developed in the Center
10	10	The Center has not had enough publicity
2	10	The Center's responsibilities have not been clearly defined
13	12	Center services have not been used by senior management
10	12	There has been a high staff turnover
10	12	Data administration has demanded substantial staff resources
8	12	Redundant applications are being developed
4	12	The hardware purchased is incompatible
13	12	The data available for end users is of poor quality
16	12	Problems occur when operations are transferred from Prototype Center to User Center

Based on Frequency of Response. 1 = The most frequently identified problem.

*From: "Information Centers: A Survey of Services, Decisions, Problems, & Successes"
by James C. Wetherbe & Robert L. Leitheiser

**Survey taken at Forts Stewart, Monroe, Hood, Ord; Rock Island Arsenal and White Sands Missile Range.

TABLE 1-4

At Fort Monroe the discussion centered on how to develop a skilled staff and how to manage an IC while the staff develops the required skills. Four ideas were discussed which would limit the skills demanded of the staff: (1) use of requirements contracts and standard products; (2) creation of support structures such as "super users", resource persons, inter-agency cooperation, and newsletters; (3) limiting the number of new products introduced; and (4) use of external and public domain resources. The participants identified five criteria for judging the potential of these ideas: (1) user acceptance; (2) management acceptance; (3) staff required; (4) facility required; and (5) time required. Based on these criteria, the participants felt the most promising idea was to promote the use standard requirements contracts.

Participants at White Sands Missile Range also chose to discuss the problem that "demand exceeds capacity." Six possibilities for managing user demands were discussed as possible solutions: (1) recruiting and retaining qualified staff; (2) reorganization of staff; (3) finding ways to measure accomplishments; (4) clarification of the IC implementation in the Army; (5) accurately selling the capabilities of the IC to the users; (6) educating users regarding computer capabilities and matching capabilities to user requirements. The discussion concluded at this point due to a lack of additional time.

The topic of discussion during the problem solving workshop at Fort Hood was also "demand exceeds capacity." Improving training efficiency was the solution proposed by these participants. Three training possibilities were discussed in depth: (1) pre-test and pre-classify students before training so that all students have similar levels of experience in a given class; (2) train users by functional area; and (3) provide more computer based training (CBT) and video based training (VBT). The participants suggested the following criteria for judging the potential of these ideas: (1) cost; (2) staff required; (3) time required; (4) user acceptance; (5) management acceptance; (6) difficulty of implementation. Given these criteria all of the ideas were judged almost equally likely to succeed. The pre-test, pre-classify concept was judged the most likely.

The participants at Rock Island Arsenal felt that if the Center's responsibilities were more clearly defined, many of their problems would diminish. In seeking more direction, the participants suggested the following sources: (1) write an IC policy and have it approved by top management; (2) explain to management the need for guidance and the consequences of lack of guidance; (3) find out from functional areas what services they need; (4) summarize current status of user support in the installation; and (5) find out how others have defined their IC's responsibilities. Six criteria for measuring the potential of these ideas were developed by the participants: (1) staffing required; (2) funding required; (3) management support; (4) time required; (5) user acceptance; and (6) IC staff acceptance. The discussion concluded at this point due to a lack of additional time.

Fort Ord participants also discussed the problem "demand exceed capacity." Six ideas were discussed by the IC staff that they perceived would address this problem: (1) daily activities plan with tasks prioritized, and allowance for "slop" factor; (2) an "on call" schedule to permit staff alternating protected development and research time with "on call" time;

(3) encourage exchange of information among staff during regularly scheduled staff meetings; (4) encourage user self-sufficiency; (5) define and set boundaries on the responsibilities of the IC; and (6) develop "super users." The discussion concluded at this point due to a lack of additional time.

1.2.3 Meeting with IC Managers

At each site, with the exception of Fort Stewart, the beginning of the site visit included a meeting with the ISC commander of the installation, and was followed by a discussion with the IC manager. At Fort Stewart, the discussion with the IC manager was interspersed throughout the visit. The goal of these discussions was to inform the installation of the purpose of our visit, and to notify them of the activities of the second visit. In addition, we received an overview of each site, and the user support services provided. This discussion enabled us to gear the orientation briefing to the specific site, and to provide information on issues to evaluate during the second visit.

1.3 IC SITE EVALUATION

ISN developed and conducted an evaluation of each of the selected model sites. The Evaluation Plan was presented by ISN at the second IPR. The modifications that were suggested were incorporated into the plan. The IC evaluation was designed to gather concrete information about how ICs have been implemented in the Army. The evaluation instruments were survey questionnaires, given in an interview format by ISN personnel. A reprint of the questionnaires is in Appendix B.

The evaluation visit was scheduled for three days at each site. During the first day, the IC manager and staff were interviewed. IC users were interviewed on the second and third days. A goal was set to interview twelve (12) users at each site. Each site visit also included an in-briefing and an out-briefing with the ISC commander of the installation. At the out-briefing, ISN shared preliminary observations with the installations. The remainder of Part A of this final report contains a full analysis of the interviews.

In addition to the IC interview questionnaires, IC managers were also asked to address: (1) IC awareness/use of the General Purpose Computer Support Command (GPCSC); (2) existing regional/local support relationships; and (3) existing installation/tactical IC relationships.

1.3.1 Model Site ICs and the GPCSC

An overview of the GPCSC was given during the orientation briefing. While some of the sites had heard of the GPCSC, none were well versed in its purpose and function. When questioned about their awareness of GPCSC during the second site visit, most sites responded that their total knowledge of GPCSC was based on the information presented in the orientation

briefing. In other words, awareness of the GPCSC had not caused it to be used. When asked why they had not used this resource, responses included two themes: (1) "they wouldn't/didn't/don't know because they are so new;" and (2) "we know how to solve most of our problems ourselves." Yet, when asked what they would like to see out of an organization like GPCSC, IC managers listed services very similar to the ones actually provided. IC staff are necessarily resourceful, and are proud of their problem solving ability. At the same time, they would like a resource available to them when a problem arises that they cannot resolve. The reasons managers gave for not using the GPCSC paralleled those frequently given by users for not using their IC. The IC functions for the user as the GPCSC functions for the IC. Both are in the position of having to prove that they are responsive to users and capable of meeting their needs, especially those users/ICs who are more experienced. Managers felt that an organization like the GPCSC would be useful, especially once it matured.

1.3.2 Regional/Local Support Relationships

The IC Managers interviewed as part of this evaluation project had strong opinions about the concept of a regional IC. The consensus of the managers was that day-to-day problem resolutions need to take place at the local level. Several stressed the importance of user convenience and the IC's relationship with its customers. The managers felt that the end-users need someone on site, who has experience with the installation. Several managers voiced concerns that a regional IC would constitute empire building, and that policy formed at the regional level would not acknowledge the individual nature of the support provided by the installations.

Three of the sites visited during the course of this project already provide support to others outside of their installation: White Sands Missile Range, Rock Island Arsenal, and Fort Ord. White Sands because of its reputation for solving problems is often requested to assist in a wide range of problems. This is a role they are proud of, and would like to continue. Rock Island is currently looking toward establishing a regional data center. Fort Ord supports ADP operations in other California installations, including such activities as network engineering.

Three kinds of activities were suggested by the managers which they felt could be appropriately provided at the regional level: (1) shows demonstrating new standard Army contract products, and conferences; (2) supplemental expertise, beyond what would be available at the local level either in terms of depth of knowledge, or of specialized knowledge, also training for IC staff, and periodic "circuit rider" training on specialized topics; and (3) a computer store concept, such as GSA's, which would allow the installations to see products before they are purchased, eliminate part of the procurement process, and facilitate the purchase of items from the standard Army contracts. One ISC Commander suggested that the regional IC be organized according to subject matter specialties rather than geographic regions. For example, a STARNET IC, or a DDN IC. A fourth idea, generated by the Evaluation Team, was that user groups could be sponsored on a regional level.

In industry the model for a local IC's relationship with its parent organization is as follows: (1) general guidelines, and overall mission established for all ICs at the headquarter's level; (2) specialized support and periodic conferences sponsored on a regional basis; and (3) direction and policy for individual ICs set locally, based on each IC specific user community.

1.3.3 Installation/Tactical Relationships

Three of the model sites in this evaluation project have tactical units: Forts Stewart, Hood, and Ord. Tactical unit end users at all sites are supported primarily by their own tactical units. At Fort Stewart the tactical units are currently re-evaluating how they can provide support to their end users. The installation IC at Fort Stewart works with the tactical units on an ad hoc basis. Most of the microcomputers located on Fort Stewart are in tactical units. The tactical units at Fort Hood have established their own ICs, with the primary purpose of providing training. The tactical units also attend the training offered by the installation IC and use its help desk. At Fort Ord the tactical units have also formed their own user support group, which apparently has little interaction with the installation IC. ISN suggests the use of installation specific Memorandums of Understanding to delineate the responsibilities of tactical and DOIM ICs, and define their relationships.

1.4 IC PLANNING AND IMPLEMENTATION GUIDE REVISION

The Preliminary IC P&I Guide was developed as part of a previous task, Task 9, under this same contract. This guide has been substantially revised, during the course of the current task, to include: (1) case studies and examples from each site; (2) materials (e.g. positions descriptions) developed by the sites; (3) incorporation in the text of "lessons learned" from the sites; and (4) evaluation and incorporation of suggestions made by the sites and the reviewers. Revisions were based on feedback requested from the model sites during the second, evaluation, site visit, and on comments requested from Army installations (reference AS-PLN-PS letter, dated 3 March 86, SAB).

A summary of the revisions to the IC P&I Guide is presented in Table 1-5. The revised IC P&I Guide forms Part B of this final report.

1.5 DATA COLLECTION FOR ECONOMIC ANALYSIS

ISN was tasked to collect the data required by AR 11-28 for the economic cost/benefit analysis of IC implementation strategies. Actual analysis of the data was not included as part of the Performance Work Statement of this task. During the first two orientation site visits (Forts Stewart and Monroe) ISN delivered the request for data. Mr. B. Dahms of ISC attended the third orientation site visit (White Sands Missile Range) and at that time elected to request the information required for the

economic analysis directly from each site. Mr. Dahms meet with ISN staff following the third IPR to extract the information pertinent to the economic analysis from the second site visit questionnaires. It was agreed that the delivery of this interview information completed ISN's contractual obligations as pertained to the data collection for economic analysis.

PRELIMINARY	10/86 REVISION
DELETED	ADDED
- Redundancy	- Bibliography
	- Case Studies and Examples
	- Materials Developed by the Model Sites (e.g. Position Descriptions, Newsletters, Forms)
	- Mention of other IMAs
	- Organizational Relationships
	- REORGANIZED TO MATCH OUTLINE OF ORIENTATION BRIEFING; TOPICS CONSOLIDATED

SUMMARY OF REVISIONS

IC PLANNING AND IMPLEMENTATION GUIDE

TABLE 1-5

1.6 IC EVALUATION PROJECT MANAGEMENT

Management of the IC Evaluation Project consisted of all the management functions conducted during the task. It included the development of a the task schedule, cost and performance reporting, research and develop (R&D) reporting, IPRs, Memorandums for Record (MFR) for the IPRs, and supervision of all personnel working on the IC Evaluation Project.

The IPRs were scheduled to coincide with the review of specific activities of the project. The first IPR, held 6 May 1986, consisted of a review of the Orientation Plan. The second IPR, held 25 June 1986, included a preliminary review of the orientation visits, and focused on the Evaluation Plan. Held on 27 August 1986, the third IPR included a

preliminary review of the evaluation site visits, and a discussion of the outline for the final report. The final IPR, held 15 October consisted a review of the evaluation site visit findings, and a summary of changes to the orientation briefing and IC P&I Guide.

The deliverables for the IC Evaluation Project and their due dates, as specified in the Performance Work Statement, are shown below in Table 1-6. Actual delivery dates are shown, also refer to the IC Evaluation Project Schedule, Figure 1-2.

ITEM	DUE DATE (DELIVERY DATE)
TASK SCHEDULE	15 WORKING DAYS AFTER AWARD OF CONTRACT (10 April)
IPR MEMORANDUM (MFR)	5 WORKING DAYS AFTER EACH IPR (13 May; 09 July 29 August; 20 October)
R & D STATUS REPORT	MONTHLY (07 April; 06 May; 06 June; 09 July; 04 August; 08 September; 07 October)
COST & PERFORMANCE REPORT	MONTHLY (07 April; 06 May; 06 June; 09 July; 04 August; 08 September; 07 October)
ALL HARDWARE & SOFTWARE	PURCHASED AND/OR DEVELOPED WHEN DIRECTED BY THE GOVERNMENT, DELIVERY WILL OCCUR AT COMPLETION OF CONTRACT (20 October)
ORIENTATION PLAN	3 MONTHS AFTER CONTRACT AWARD (06 May)
EVALUATION PLAN	3 MONTHS AFTER CONTRACT AWARD (25 June)
FINAL REPORT	AT COMPLETION OF CONTRACT (20 October)

CONTRACT DELIVERABLES

TABLE 1-6

SECTION 2
SITE EVALUATIONS

2.0 INTRODUCTION

This section presents the summarized the results of the analysis of the evaluation visits to the six sites. Section 2.1 gives a brief introduction to the evaluation phase of the project. Section 2.2 presents the data analysis. Section 2.3 discusses concerns expressed by managers in the field. Section 2.4 discusses recommendations for future directions for ICs. All figures are grouped together at the end of this section.

2.1 DATA COLLECTION

The evaluation of the IC's at the six model sites was approached from the standpoint of determining what services are being performed at the site by the IC; and what strategies are employed by the IC in performing its tasks. Three days were spent at each site during the evaluations. The first day consisted of; (1) an introductory meeting with the local ISC commander, (2) and interviews with the manager and staff of the IC. Interviews with end users were conducted on the second and third days, with the goal of interviewing twelve (12) users at each site. This goal was not achieved at all sites because of schedule conflicts that arose with some of the users. Each interview was scheduled to last approximately one hour. The last day included another meeting with the local ISC commander wherein a summary of the initial findings was presented.

TABLE 2-1 IC BACKGROUND

	STEWART	MONROE	WSMR	HOOD	RIA	ORD
PLANNING DATE:	10/85	5/84	10/85	1984	10/84	?
IMPLEMENT. DATE:	10/85	7/85	7/86	1984	1/85	5/85
FIRST MGR.:	YES	YES	YES	NO	YES	YES
START DATE:	10/85	7/85	6/86	10/85	3/85	5/85
PRIOR ASSIGN:	DP	DP	COMM MGR	DP	DP	DP
COMPUTER EXPER.:	28 YRS	17 YRS	20 YRS	10 YRS	24 YRS	9 YRS
MICRO EXPER.:	NONE	5 YRS	7 YRS	5 YRS	8 YRS	1 YR

Table 2-1 gives a condensed background of each IC and the experience levels of the respective managers.

2.1.1 SURVEYS

Three interview sets were developed; (1) an IC Managers Survey, (2) an IC Staff Survey, and (3) a User Survey. In addition, fifteen other check lists, relating to pertinent aspects of end user computing, were used with the Staff and User surveys.

The IC manager's survey was designed to obtain information relative to the IC itself, including: (1) IC manager's background, (2) IC planning factors, (3) IC missions, (4) IC organization, (5) IC policies, (6) records and reports maintained by the IC, and (7) Lessons learned.

The staff survey collected data relating to the staff members background, and his understanding of the missions, goals, and services provided by the IC. The check lists were used to collect information regarding the staff member's knowledge of, and degree in emphasis placed upon, the IC policies relating the the issues addressed by the check lists.

The user survey was designed to collect information about the experience level, computer usage, hardware and software problems, training, productivity improvements, use of IC services, and assessment of the utility of the IC.

Check lists were employed to determine the way that the various control issues are addressed in the user's work place. Each check list contains questions relating to a specific issue of computer operations that should be addressed in the work place. Copies of each survey and check list are contained in appendices B through H.

2.2 DATA ANALYSIS

This section presents the results of the surveys, summarized for the six sites. Noteworthy items specific to any site will be highlighted. Details of the site evaluations are contained in appendices C through H.

2.2.1 User Needs

Figures 2-1 through 2-6 are used to describe the typical users. Experience tends to indicate the types and amounts of training needed. Usage factor help to define hardware and software needs.

The computer experience of the users interviewed is shown in figure 2-1. The experience level is seen to vary from less that one year to over twenty years. Microcomputer experience, not shown, is considerable less for most of the users. The user with several years of general computer experience can be expected to need less introductory level training, and be ready for advanced training in the off-the-shelf software packages. User experience level data was not collected at Fort Stewart.

Another factor in determining user's needs is the number of hours per week that the user is on the computer. A user that is spending most of each day using his system is also most likely the one that will be looking for advanced techniques to make the most use of the software that is utilized the most. Figure 2-2 shown the means and spreads of microcomputer usage at each of the sites. Figure 2-3 presents similar data for main frame (and/or minicomputer) users. There was only one user interviewed at Fort Ord who used the main frame exclusively.

Figure 2-4 shows the average length of a session, in minutes, on the computer. The users exhibiting the long sessions were typically word processing users. Such users are more likely to require dedicated hardware than users who typically have sessions of 20 to 30 minutes.

Frequency of use of application software aids in making the determination of the number of software packages that should be purchased. Where a software package is used daily, each such user should have a separate package. On the other hand, if the software is only used monthly or less, a central library of software, that could be checked out when needed would probably suffice. Under a check-out arrangement, care must be exercised to ensure that unauthorized copies of the software are not made. The frequency of use of the most popular types of software is shown in figure 2-5 for microcomputer users and figure 2-6 for main frame users.

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in figure 2-7. Complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability. Figure 2-7 shows the percentage of the users who felt that the hardware change would be desirable. Of the hardware options listed, better printers and better backup systems for backing up a hard disc were the most frequently selected. Consideration should be given to including an efficient backup system with every hard disc system purchased. The cost-effectiveness of providing each user with a letter quality printer must be assessed. The user's convenience, being able to get final copy from his work station rather than at a remote printer, must be weighed against the added expense of a letter quality printer.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard software packages. The report generator capability desired should be capable of easily developing report formats and extracting data from several different files with different characteristics. Software desires exhibit the same level of user expertise as the hardware. Data communications (micro network and/or mainframe link), and software interface are the big items. The IC should direct its technical research toward finding new software that is acceptable for these purposes. As shown in figure 2-8, networking, software interface, and micro/mainframe links were the most popular. The software interface issue relates to the ability to utilize (or import) data from say a spreadsheet to a data base or word processing application without having to do extensive data conversion. Some of the newer packages have this capability, particularly if the software is sold by the same software developer. Software developed by competing software companies though are often impossible to interface conveniently.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure 2-9 is a summary of the users response to queries relating to the topics

shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. Interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using of that software is needed. Nearly ninety percent of the users indicated a desire to know more about the software they were currently using. This indicates a strong need to provide more advance training for these users.

Users were asked other questions relating to some of the usual complaints from users that appear frequently in the literature. These complaints include not getting enough time on the computer, not being able to get the computer they want, can't get funds to purchase hardware and software, long delays in procurement, can't get training, access to data, and timely assistance. A summary of the responses to these questions appears in figure 2-10. Procurement delays is the leader in the complaint department. The IC is getting the blame for these procurement delays when in reality it is not within the IC's control to speed it up. The IC is in the procurement cycle because of the desire to standardize the microcomputer configurations purchased, but it should make sure that the user interfaces with, and blames any delays upon, the procurement division.

2.2.2 Types Of Support

Figure 2-11 summarizes the types of hardware supported by the ICs. The number of ICs supporting mainframe applications was not expected. The data shows, however, that even the startup IC cannot ignore support for the mainframe users if suitable interactive software is installed on the mainframe. Also the number of ICs that are supporting linked micros and micro-computer networks was not expected.

Five of the six sites report attempting to support all hardware and software in the end user community, but at least one is reconsidering the idea. Most report though that there is a preferred list of hardware and software that receives better and faster support than ones not on the preferred list.

The degree of support offered to end users developing applications using off-the-shelf software is shown in figure 2-12. The two sites, Rock Island and Fort Hood, that report performing application development tasks for the user, have found the workload is not supportable with the resources available. Both are planning to cease providing such support.

The support of the use of compilers for custom programming of appli-

cations by the users is shown in figure 2-13. Most ICs offer training and development assistance, but only two actually performs development work. This site is currently referring such requests to Systems and Programming vice attempting to do the work in the IC.

Data access policies supported by the IC are shown in figure 2-14. Most of the IC assist the users in gaining access to the data they need. Only one site, Fort Ord, allows end users read/write access to central data files. The Fort Ord IC also has Data Base Administration duties for the installation.

All of the ICs have a review function in the microcomputer procurement cycle as shown in figure 2-15. Half of them have approval authority, in the sense that the user has a harder time justifying the purchase of a configuration that is not supported by the IC. Two of the sites, Fort Stewart and Fort Monroe, actually make out the requisitions.

Figure 2-16 depicts the various vehicles utilized for user training. The data reflects the heavy dependence on classroom and hands-on training. In addition to the resources shown, all sites report some degree of self-instruction utilizing vendor developed manuals, in-house developed manuals or third party developed manuals. All report having a training backlog.

2.2.3 Missions, Goals And Objectives

The priority given to the different factors during the IC's planning stage is shown in figure 2-17. The priorities shown are averaged over all sites. A lower priority value means that the factor was given more importance than one with a higher number. The relative order of the planning factors is about what was expected.

The average priorities assigned to the standard IC mission areas is shown in figure 2-18. Contrary to what is touted in much of the IC literature relative to ICs in industry, reduction of the DP backlog was not the highest priority mission. The display indicated the degree of user orientation of the ICs.

All sites have mission statements which vary greatly in detail. Fort Monroe's are very detailed with objectives and specific milestones (Appendix D). Both Fort Hood and Fort Ord have IC information papers which describe the IC and its missions. Fort Hood and Rock Island both measure their degree of success on user factors such as number of users trained, or number of letters of commendation received from user management. Rock Island reported a staff member's receipt of an incentive award.

The strategies used for start-up are shown in figure 2-19. The fact that most opened their doors to all comers indicate the degree of urgency accompanying the need for the IC's services.

2.2.4 Services

Figure 2-20 shows a summarization of the services reported to be provided by the ICs at the six sites, including services which are planned to be implemented within the year. The number of services provided by an one IC is surprising. The number of services is another indication of the demand for such services that exists at each installation.

Fort Monroe has developed a trouble report tracking system, which in addition to logging the trouble calls and generating followup requests, produces weekly and monthly reports of outstanding items.

2.2.5 Organization

All of the sites, except Fort Stewart and Rock Island, provide staff specialists for each of the major disciplines; mainframe, microcomputer, training, hardware installation and maintenance, and data communications. Each, however, has assigned produce specialists to all preferred products. These product specialists are the action officers for help/trouble calls.

At Rock Island each directorate has a full time person called a computer coordinator. This person is the local contact person for personnel in that directorate for computer related problems. The IC uses the coordinator as a means of relaying information about the IC to the users within that department. Fort Monroe utilized the Information Systems Officers (ISOs) in a similar fashion. At Fort Monroe, the IC conducts monthly meetings with the ISOs, discussing the status all outstanding requests for services and unresolved trouble reports.

2.2.6 Staffing

The staffing levels for each of the sites is shown in table 2-2.

TABLE 2-2 STAFF SIZE

SITE	FORT STEWART	FORT MONROE	WHITE SANDS	FORT HOOD	ROCK ISLAND	FORT ORD
	14*	14	9**	12	12	8

* Only two involved in microcomputer support

** one full time and eight part time

All but five of the combined staff members came from a DP background. At Fort Monroe this includes three contractors who man the IC help desk. At Fort Ord the help desk is manned by military personnel. Fort Stewart has one additional military part time staff member. Five of the six civilian staff members at Fort Ord are overhires.

IC managers and staff members were asked to rank five important traits that each staff member should have. The composite results of this survey

are shown in figure 2-21. The high scoring of microcomputer experience and technical knowledge is contrary to the importance placed on such traits in industry, where inter-personal and presentation skills were ranked higher. A possible explanation lies in the fact that most of the staff members interviewed had a DP background.

2.2.7 Facilities

All ICs were located in separate quarters, and all except White Sands had space for demonstrations of hardware and software. Training facilities were also in separate spaces. Most of the ICs had equipment (mostly borrowed) and software so that users could try a software package prior to making a purchase decision. White Sands and Fort Ord maintained a library of public domain software that a user could obtain free of charge. Rock Island is planning to do the same. White Sands and Fort Stewart maintain catalogs of user developed software, again available to any user.

2.2.8 Funding

The overhires at Fort Ord are funded by the user directorates. This creates some morale problems with the staff, i.e. a lack of job security. The positions for Fort Monroe were obtained by pulling the Programmer analysts from the other directorates and contracting for the programming and systems development support for those directorates. The IC was manned at Fort Hood by deletion of weekend and night operations shifts in the computer center. White Sands and Rock Island contract for all or part of the training.

2.2.9 Internal SOP

Three of the sites have promulgate Standing Operating Procedures Manuals. Two of the others have begun to draft them. The SOP at Fort Monroe is very detailed, as can be seen from the table of contents included in appendix F of the Planning and Implementation Guide.

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in figure 2-22. The value of the "aware" variable is computed as the percent of the staff members' responses that were the same as his manager's response to whether or not a service is provided, or planned, or not planned. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a breakdown in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementing stage. All of the staff members were not interviewed, and the data presented here may not accurately represent a cross-section of the staff. Staff awareness is high for all of the most commonly used services. The overall degree of staff awareness shown in figure 2-22

is a pooled estimate of all the sites.

2.2.10 Measures of Effectiveness

The effectiveness of the IC may be measured in many ways such as those in use at Rock Island, shown below:

The number of letters of appreciation and cash awards given to staff members by functional users,

The number of new requests for services,

The number of trained users in the workplace,

The number of new products researched and found to be of value to the functional users,

Feedback from the users as to the contribution of IC staff members to their cost savings and/or productivity improvement.

Another measure of the IC effectiveness is obtained from a set user advice scales. Figure 2-23 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown as the score value in the figure, where a low score indicates a higher preference for that source than one with a higher score. A score of one is for the best source.

2.2.11 Marketing

TECHNIQUE	STEWART	MONROE	W S M R	HOOD	R I A	ORD
NEWSLETTER				X		
USER GROUP	X		X			
BRIEFING		X		X	X	X
INDOC. CRS				X	X	
HANDOUT				X		X
USER MANUAL						
SOFTWARE LIB.	X	X	X	X		X
DEMOS	X	X		X	X	X
MICRO STD		X				
I S O'S		X			CC	?

CC Computer Coordinators
 ? Information Systems Analysts

TABLE 2-3 MARKETING THE IC

Table 2-3 displays some of the marketing tools used by the ICs to get information to the user community. The most noteworthy technique is used

at Rock Island Arsenal where the IC's Management Indoctrination Course has almost become a mandatory course for all upper and middle level management. The course at Fort Hood, on the other hand, is primarily to give the managers enough expertise to get into the electronic mail system. User groups have been in existence for more than twenty years at White Sands. White Sands also conducts an annual survey of user developed applications and publishes a catalog with descriptions of existing programs, and the name of a contact point. White Sands also maintains a bulletin board containing a library of public domain software. Fort Monroe uses the ISOs from the other directorates as a vehicle for spreading information through regularly scheduled meetings. Rock Island has the computer coordinators (CC) who also function in a similar manner. Fort Ord has Information Systems Analysts (?) in other directorates but does not seem to utilize them in the same manner.

Another estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

The user awareness measures for each service at each site are shown in their respective appendices. Composite user awareness values, computed by pooling all the individual site values, are shown in figure 2-24 as the percent of users that are aware of the true status of that service at that site. The figure indicates that more effort should be devoted to increasing user awareness.

2.3 FIELD CONCERNS

The concerns discussed here arose during the course of the interviews and represent problems that the IC managers feel are due to circumstances beyond their control. Any solution to these concerns must come from higher authority, and are reported here for information purposes.

2.3.1 Staff and Resources

The ICs have manned their facilities using three different strategies, none of which are truly satisfactory. One strategy involves contracting for programming, and using the positions that were assigned for the programming tasks to man the IC. A second strategy involves curtailing services in another sector to provide the spaces for the IC. The third involves the use of temporary overhires to staff the IC. Neither strategy is particularly satisfactory. Attempts to obtain additional positions in accordance with existing directives have not met with success either. One site, Fort Stewart, has been unable to utilize any of these strategies, therefore is providing all microcomputer support with only two people.

There is a need to find a way to establish an allowance of hardware and software for the ICs to use for both demonstration purposes, and as backup equipment to be loaned to users who have critical applications to be performed and whose hardware is not operating. Currently, these needs are being met using equipment that has been received for another user, but has not yet been delivered.

2.3.2 Guidance

There was some concern expressed regarding conflicting guidance received as to where within the DOIM organization the IC should be placed. It is believed that this conflict has subsequently been resolved.

2.3.3 Stove Pipe Systems

ICs continue to be hit with requests to provide support for some new system (a "stove pipe" system) that was received from some other source. These systems, part of a larger program, are many times fielded without warning, training, or installation instructions. Responding to these requests is an unscheduled expenditure of IC resources. Further examples of the impact of these systems on the resources of the IC are contained in appendix E.

2.3.4 Procurement

The first obstacle encountered by a user attempting to order computing equipment, given he has funds, is the constraints imposed by the Information Management Plan (IMP). If the equipment is not included in an approved initiative, it must be submitted as an out of cycle initiative. Under prior directives, a low limit existed wherein purchases for less than the low limit did not require higher approval. This escape no longer exists.

The next obstacle comes in long lead times for equipment ordered from the GSA schedule. For example, Zenith deliveries are taking six to nine months. If the order is for equipment not on the GSA schedule, then other

procurement directives come into effect, further delaying the receipt of the equipment.

The resultant impact is that the IC is getting blamed for long procurement delays which it has no way to control.

2.4 FUTURE DIRECTIONS

The loudest complaint received concerned the inability to get training. Users were crying for both introductory and advanced training. None of the ICs have the resources to increase the level of in-house currently being given. Alternatives to be evaluated include increased use of contract training, with the costs being charged back to the end user; investigating the feasibility of the use of advanced computer based and/or video text training, and developing a base of "super users" in each directorate who can fulfill some of the training support requirements, particularly the followup or refresher training.

Another void in the training area is in user management training. Fort Hood and Rock Island have partially filled this void with their management courses. There is however no course that currently alerts the user manager to the pitfalls of end user computing, and to the supervisory responsibilities of management where end user computing is being done. User management must also be made aware of the need to make sure that the user has the opportunity to get required training, and to practice what was learned, if the user is to become truly productive.

FIGURE 2-1 USER EXPERIENCE
YEARS OF EXPERIENCE

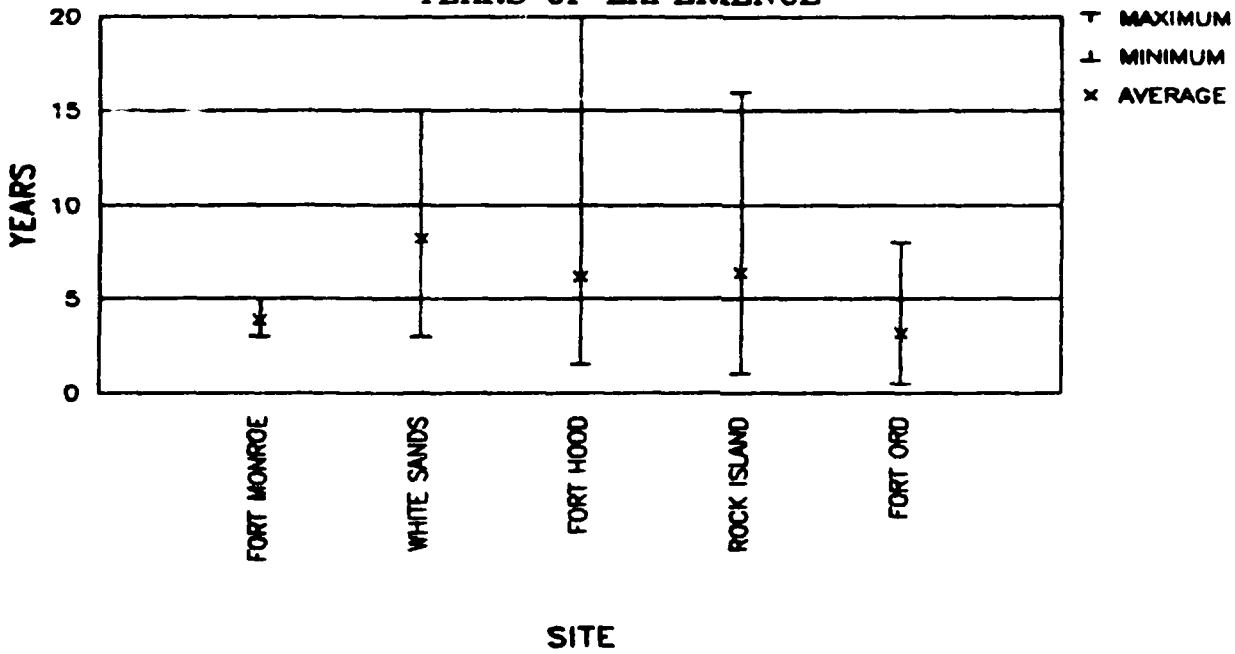
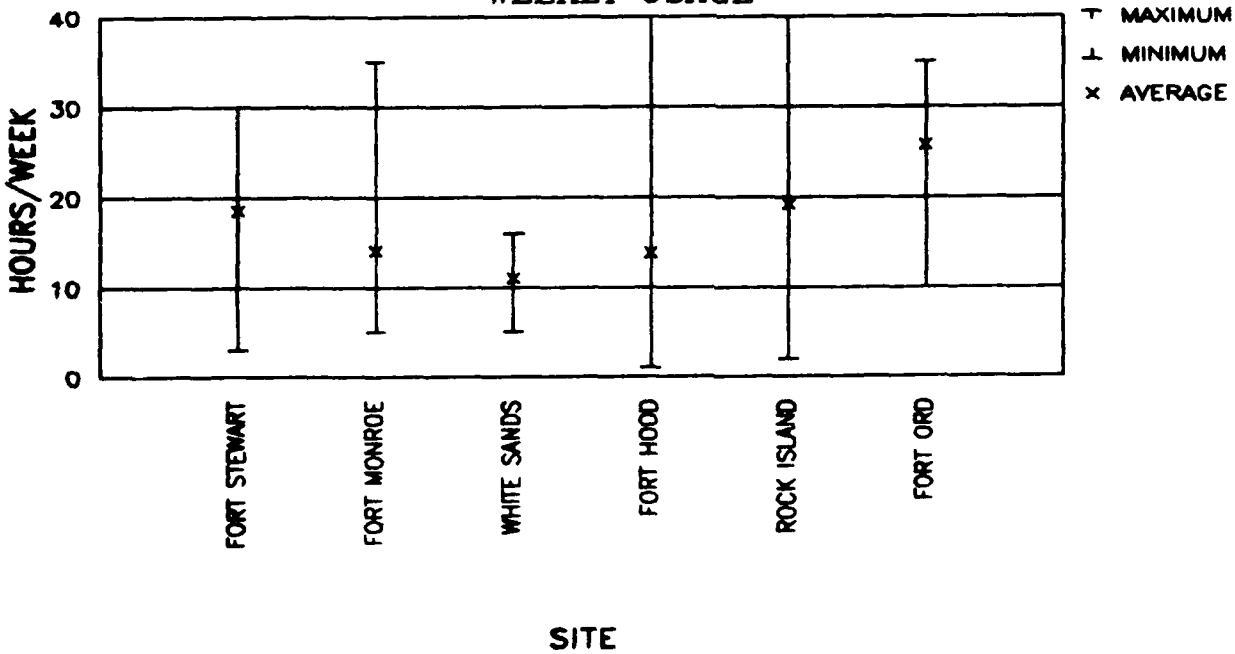


FIGURE 2-2 MICROCOMPUTER USAGE
WEEKLY USAGE



**FIGURE 2-3 MAIN FRAME USAGE
WEEKLY USAGE**

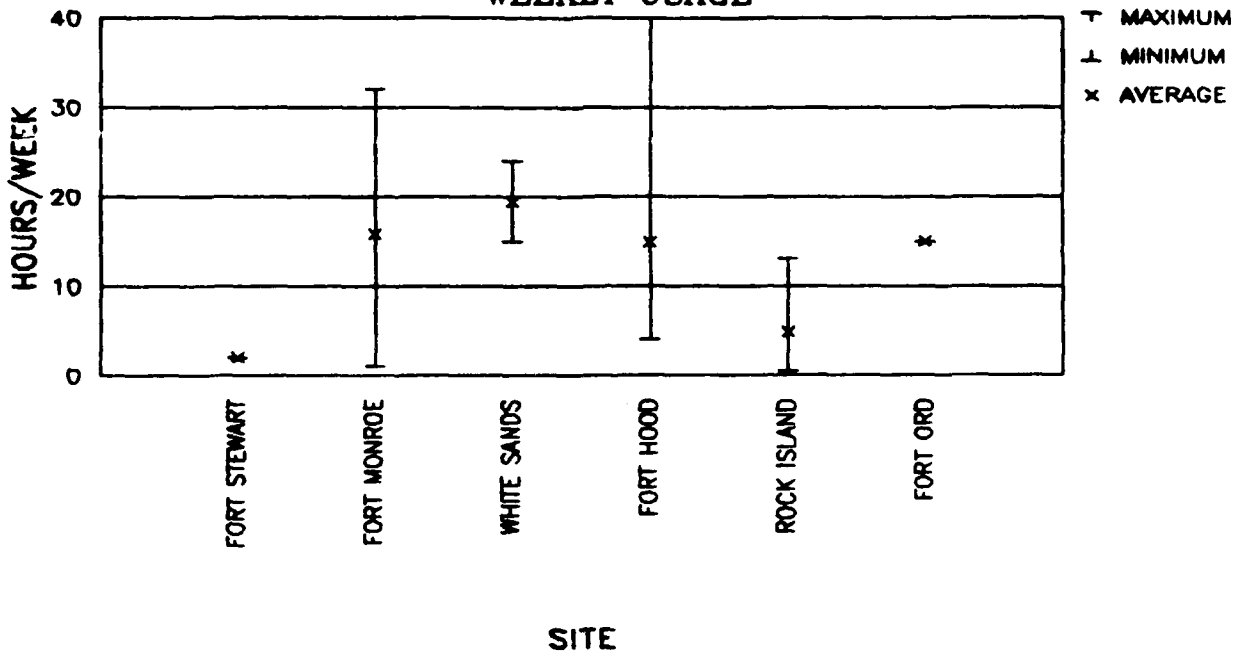
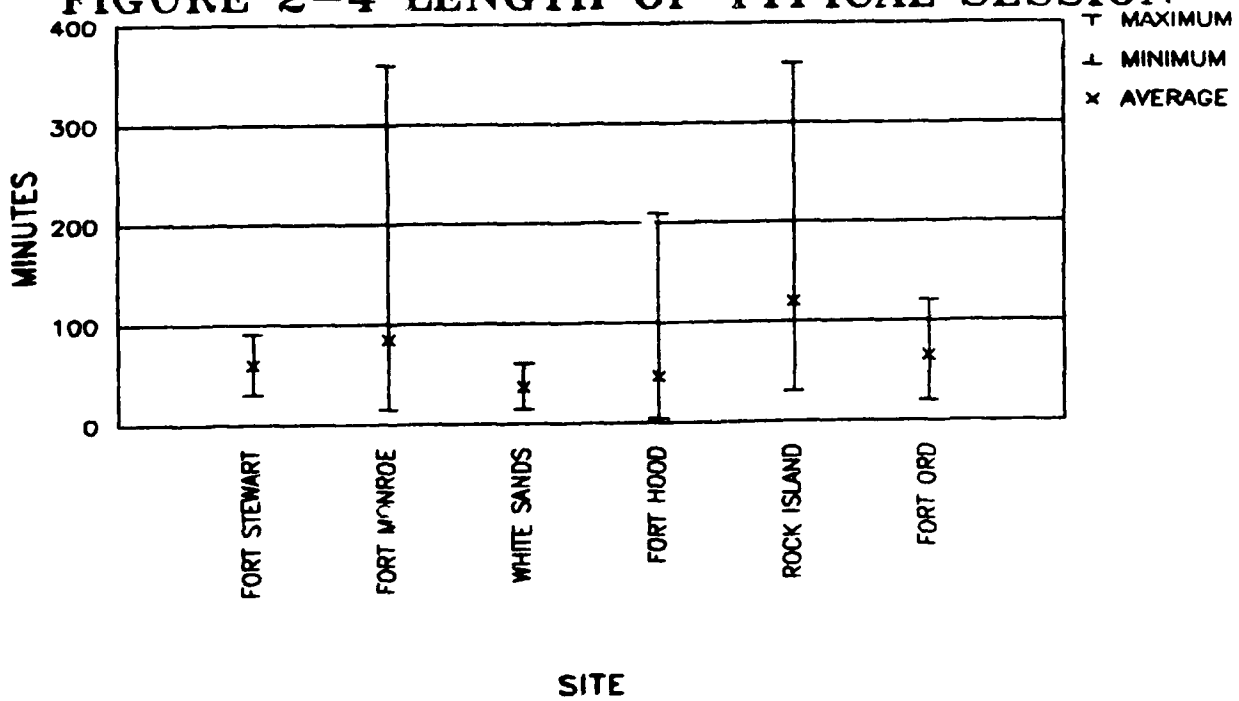
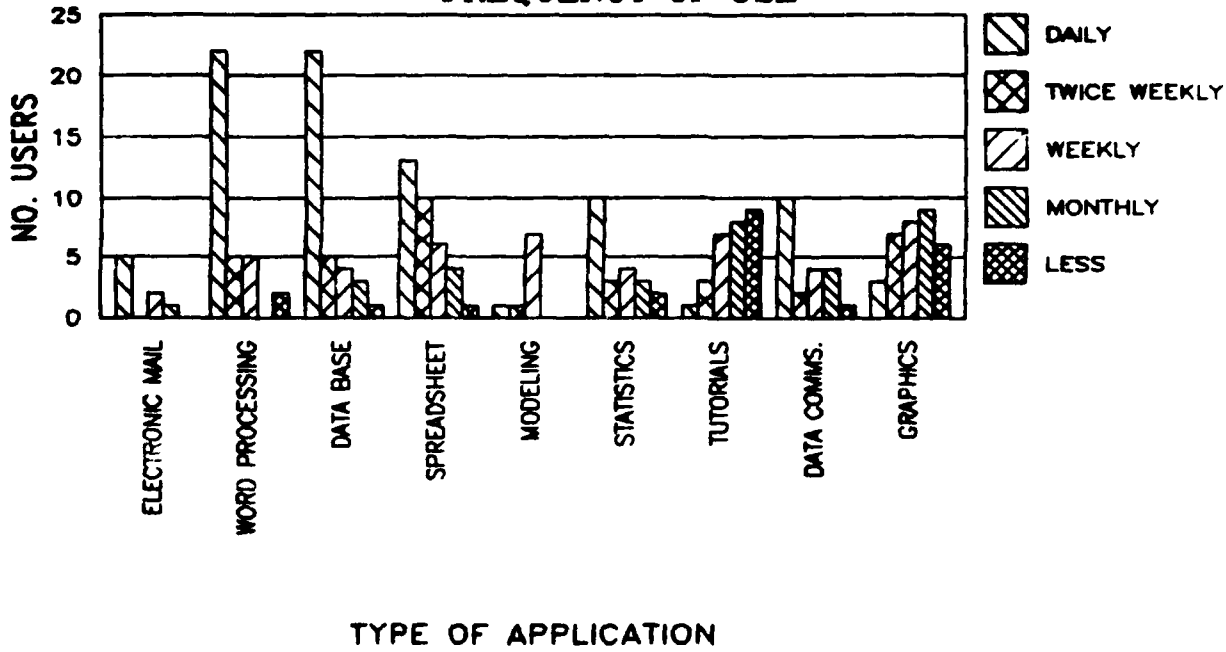


FIGURE 2-4 LENGTH OF TYPICAL SESSION



**FIGURE 2-5 MICROCOMPUTER APPLICATIONS
FREQUENCY OF USE**



**FIGURE 2-6 MAIN FRAME APPLICATIONS
FREQUENCY OF USE**

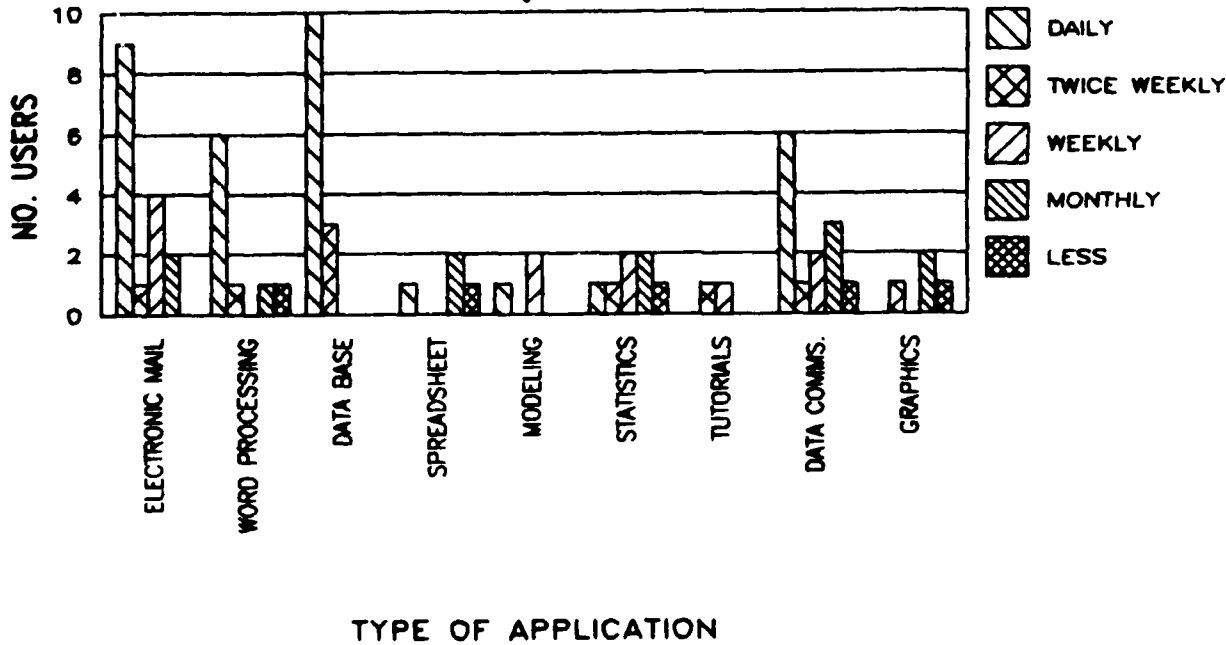
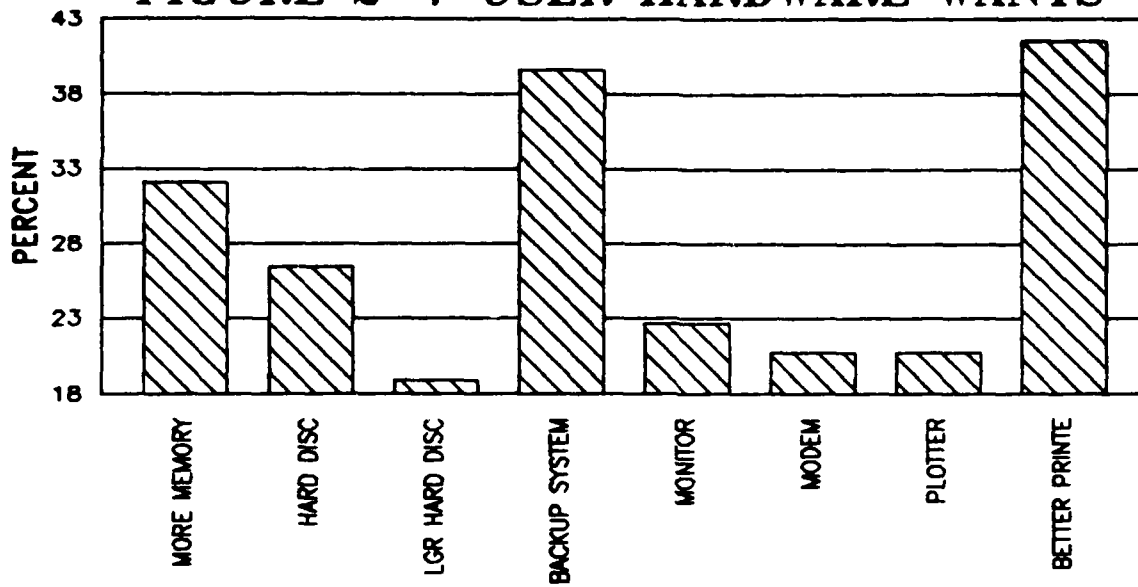
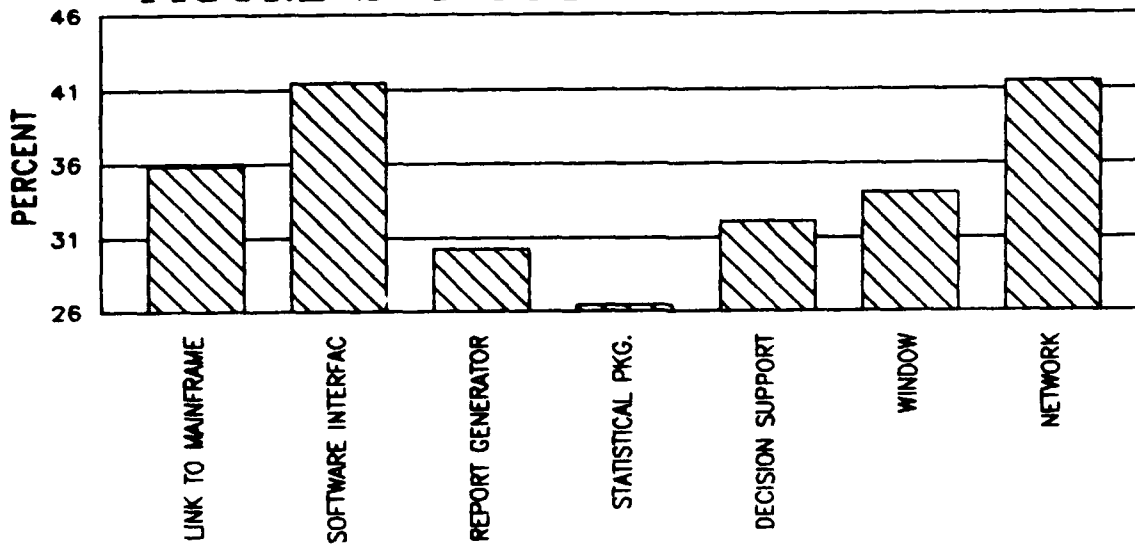


FIGURE 2-7 USER HARDWARE WANTS



AVERAGE OF ALL SITES

FIGURE 2-8 USER SOFTWARE WANTS



AVERAGE OF ALL SITES

FIGURE 2-9 USER KNOWLEDGE WANTS

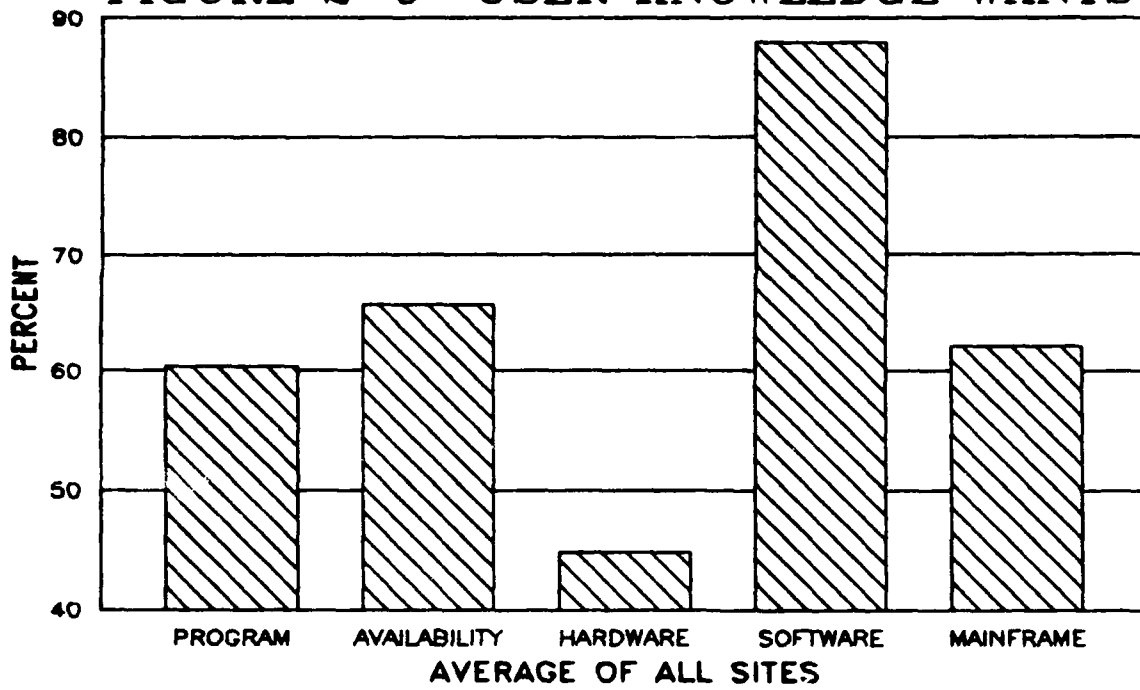
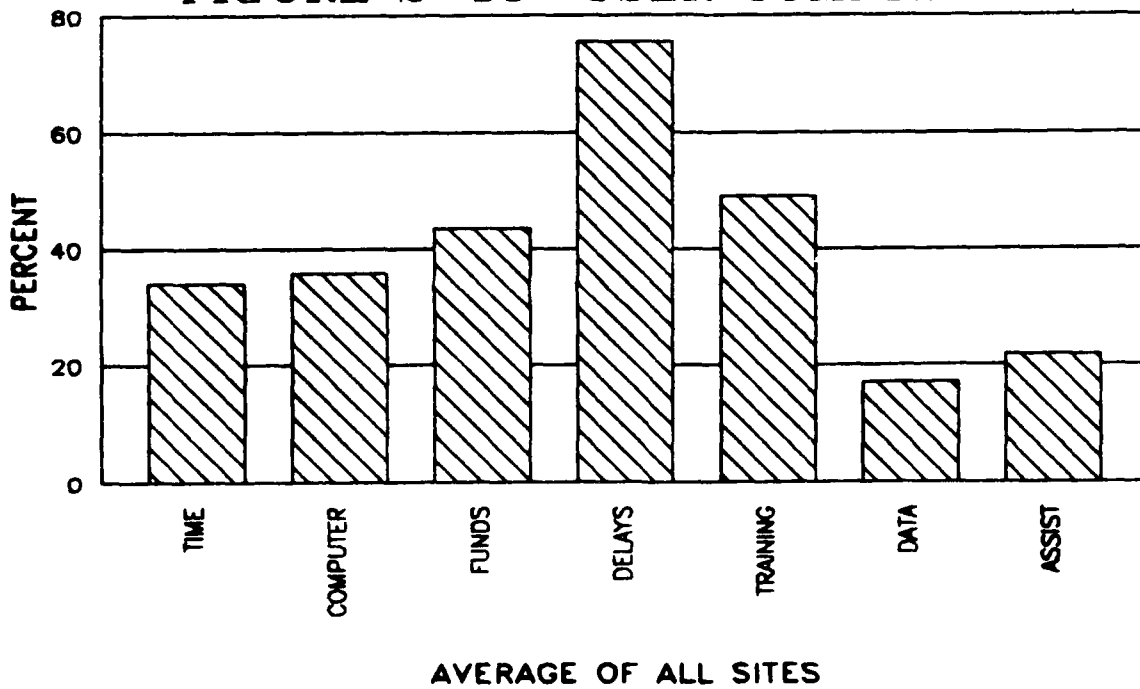


FIGURE 2-10 USER COMPLAINTS



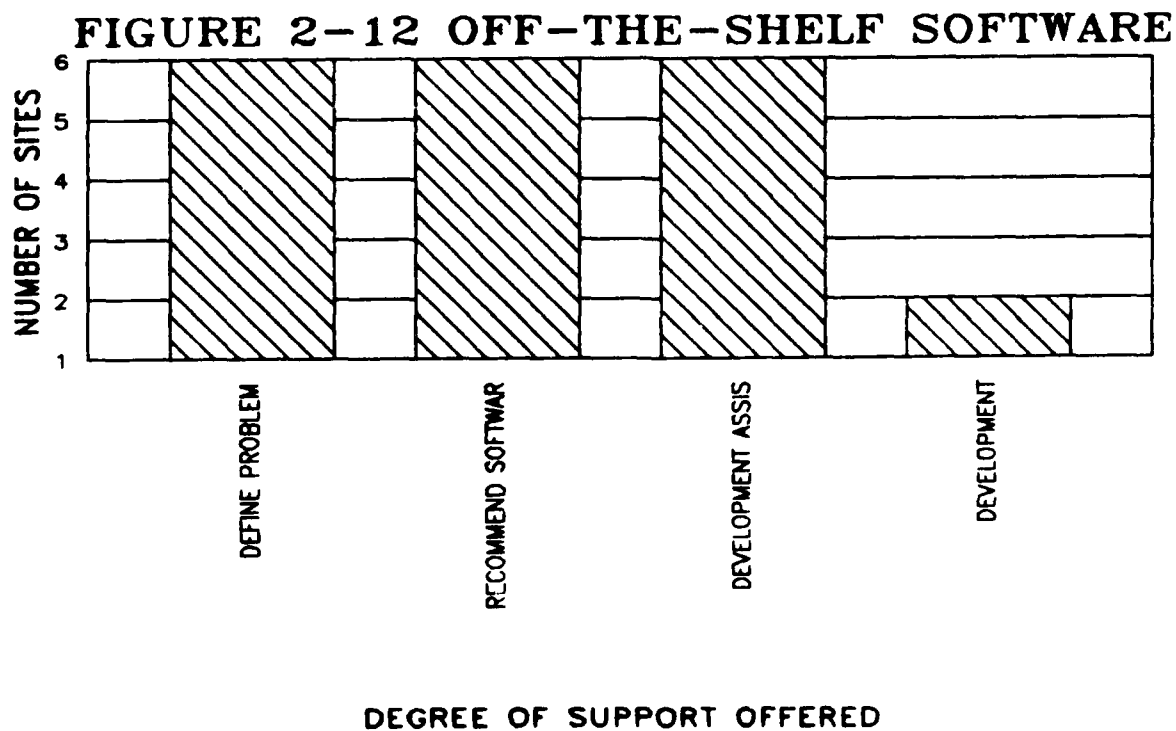
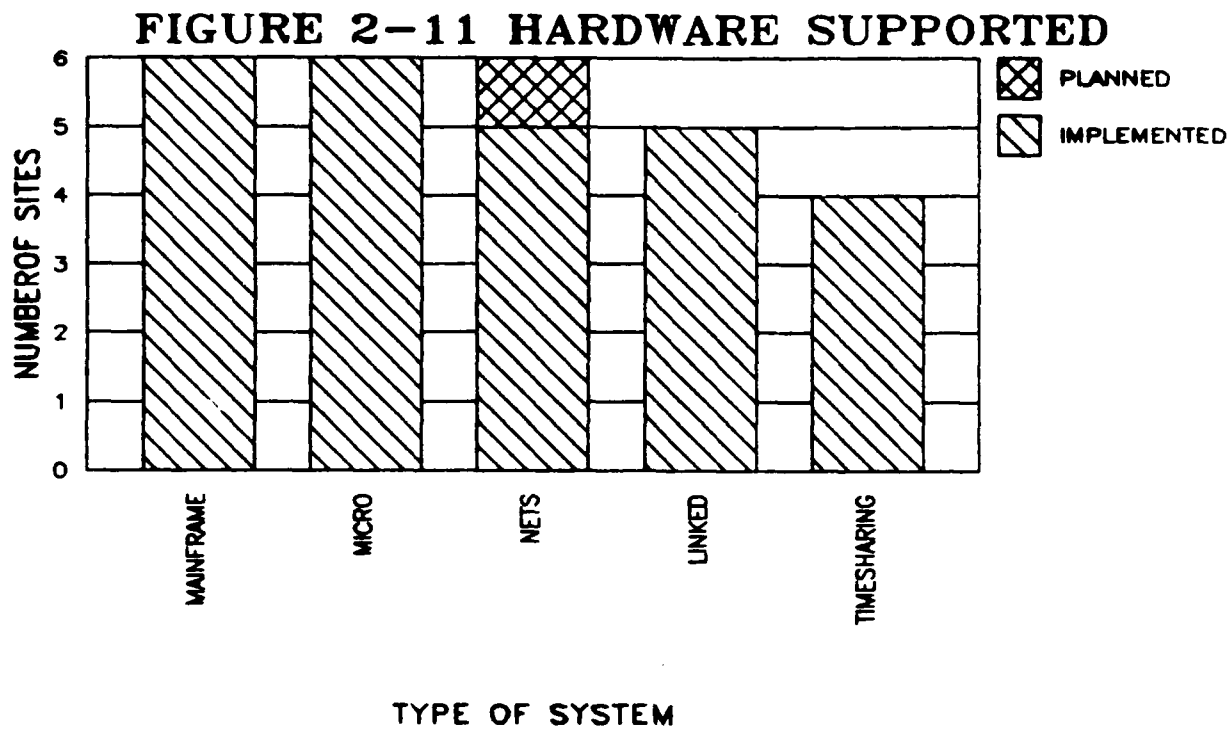


FIGURE 2-13 COMPILER SUPPORT

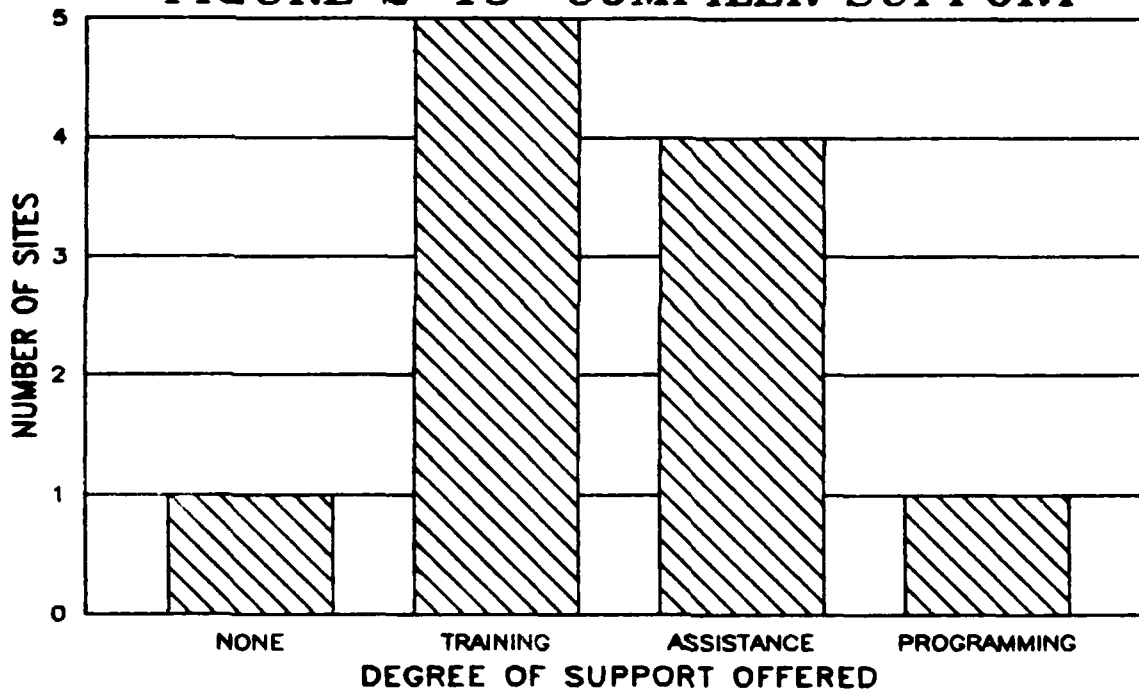


FIGURE 2-14 DATA ACCESS

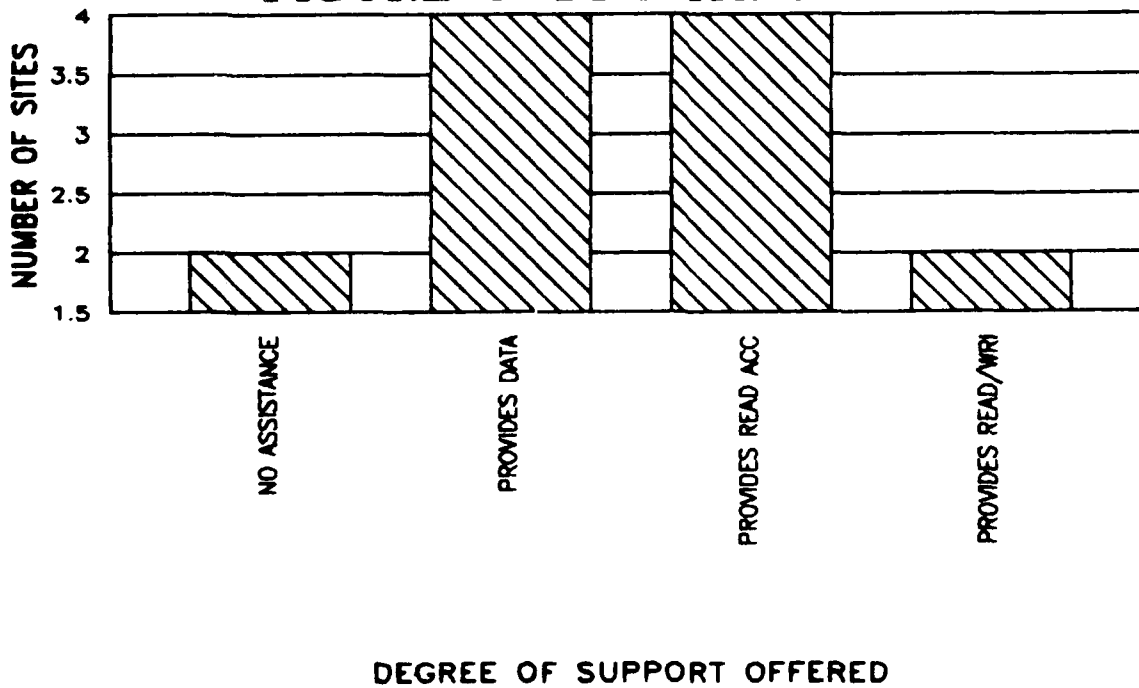


FIGURE 2-15 PROCUREMENT

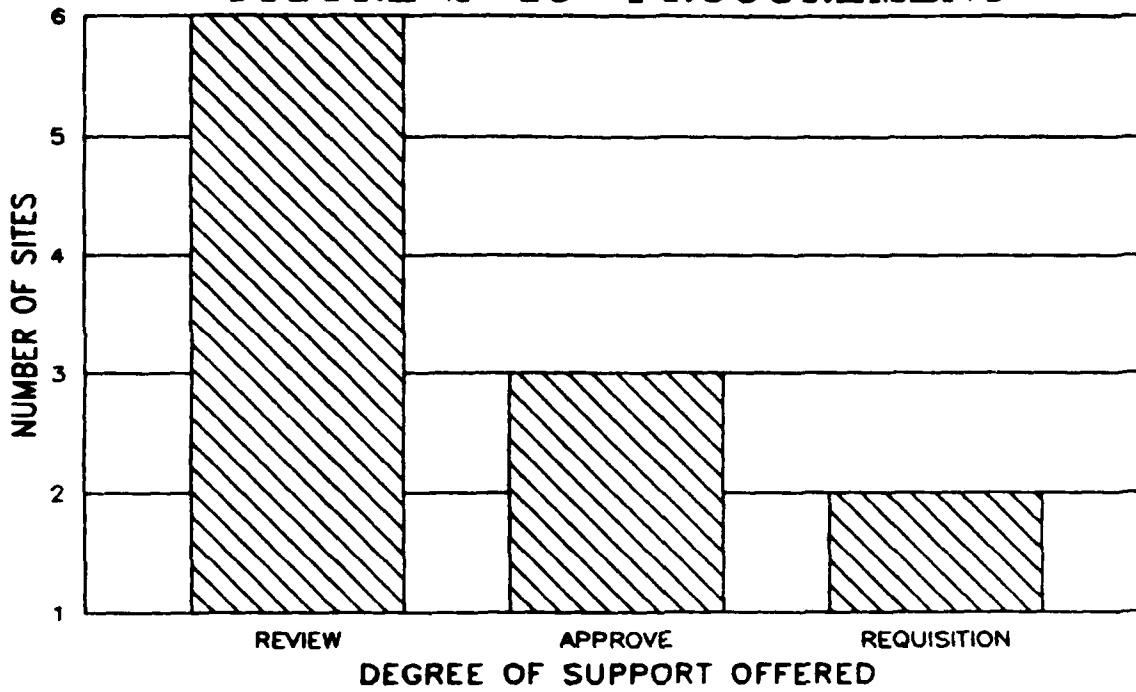


FIGURE 2-16 TRAINING

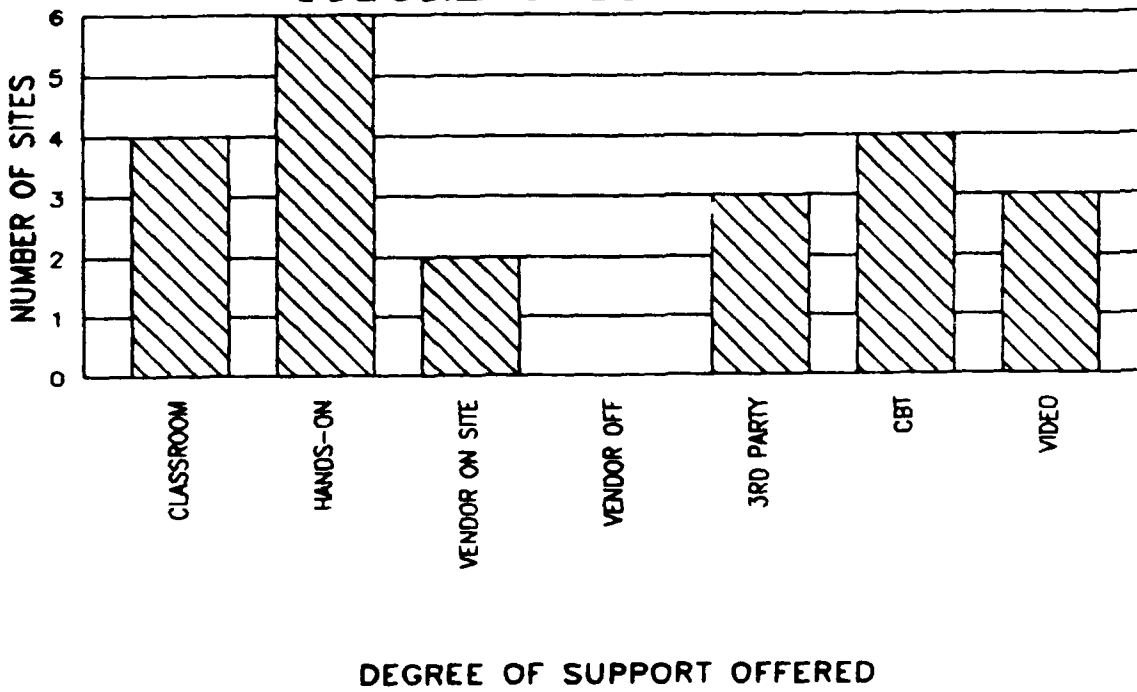
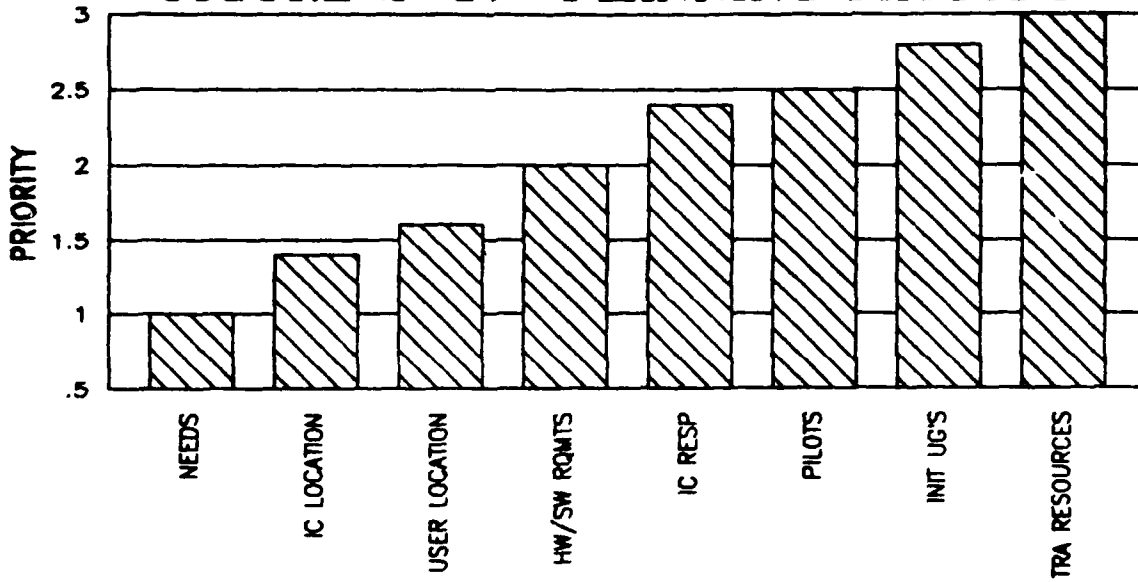
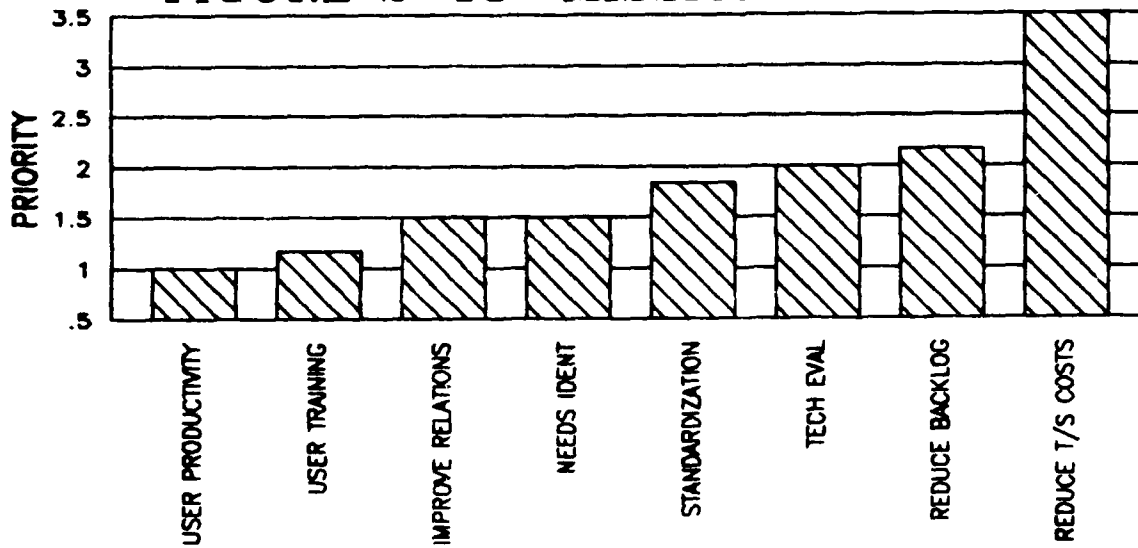


FIGURE 2-17 PLANNING FACTORS



NEEDS

FIGURE 2-18 MISSION SELECTION



MISSION AREA

FIGURE 2-19 START-UP STRATEGIES

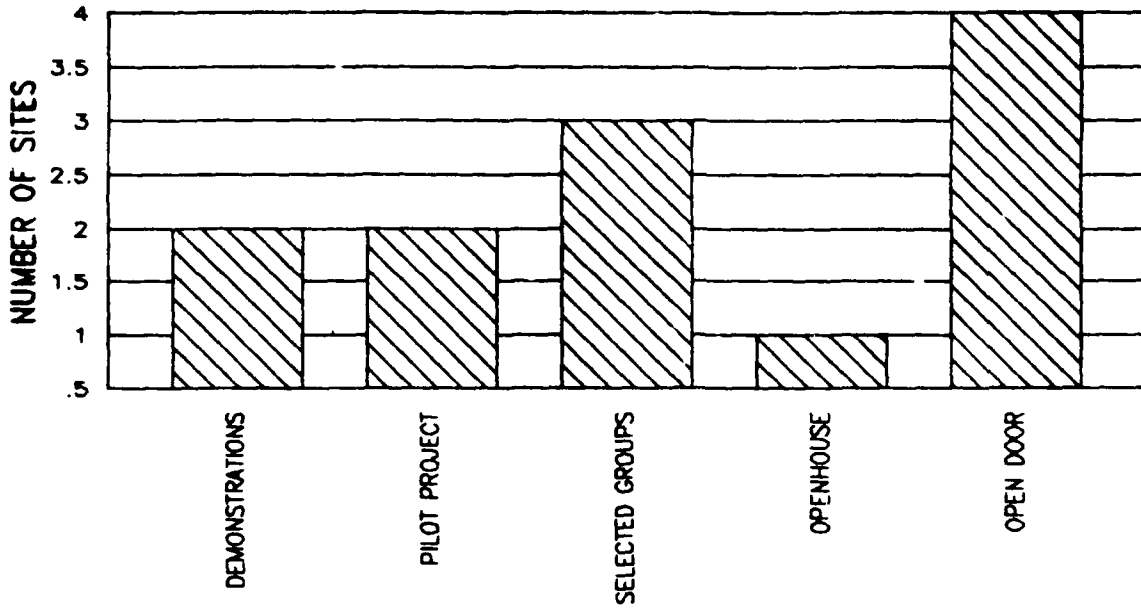


FIGURE 2-20 SERVICES PROVIDE

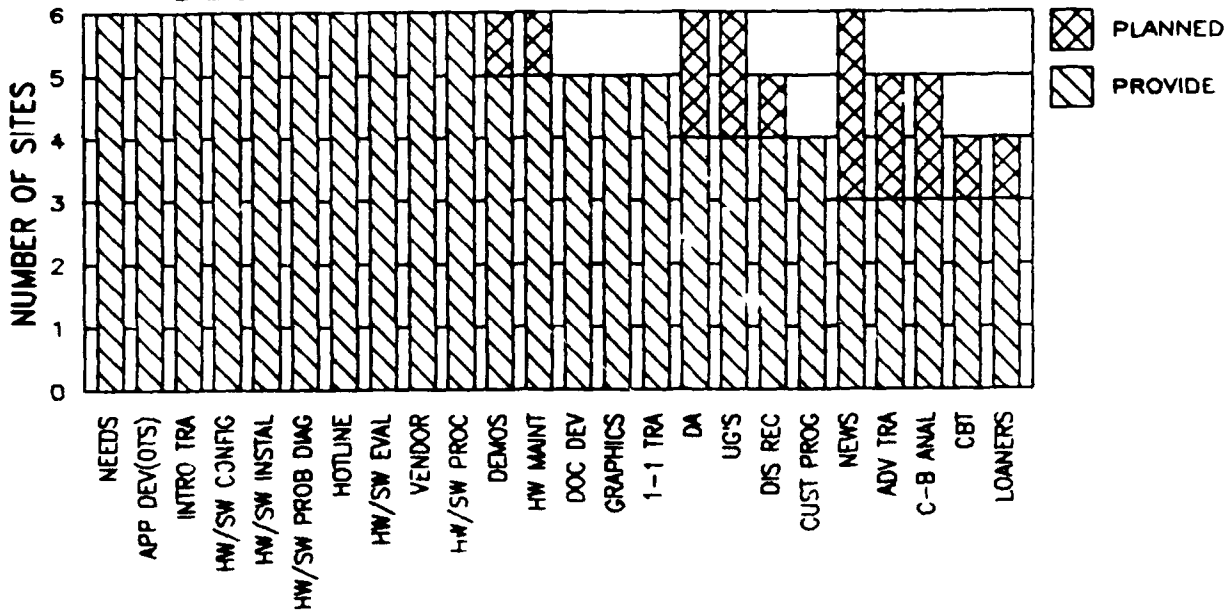


FIGURE 2-21 STAFF TRAITS

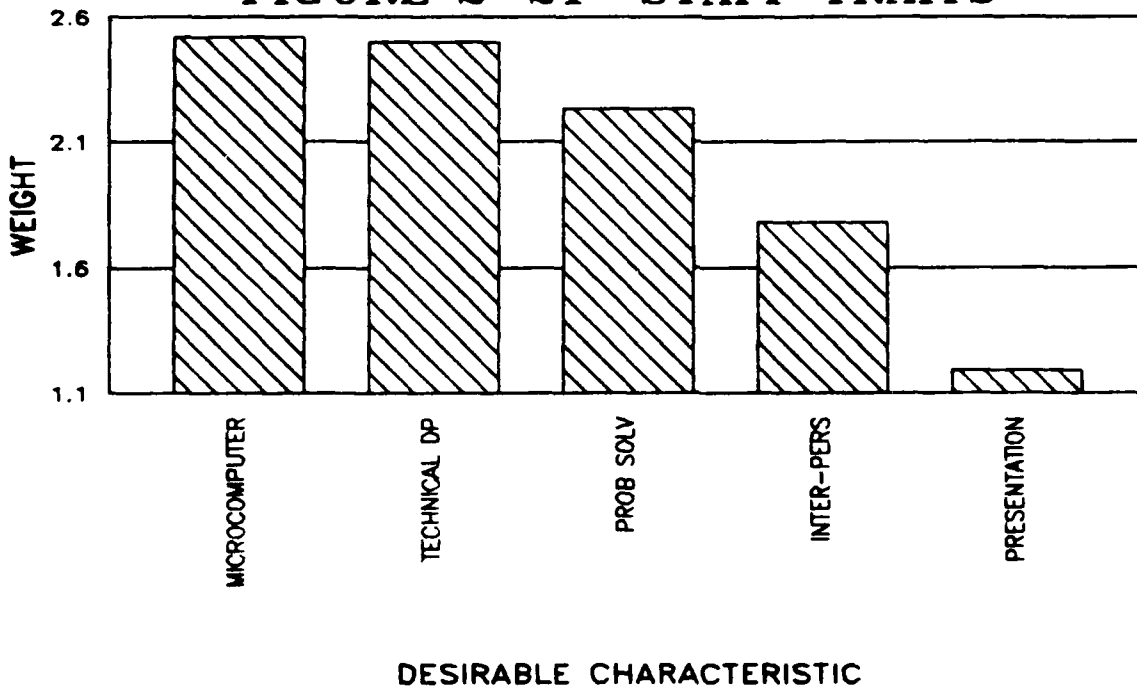


FIGURE 2-22 STAFF AWARENESS

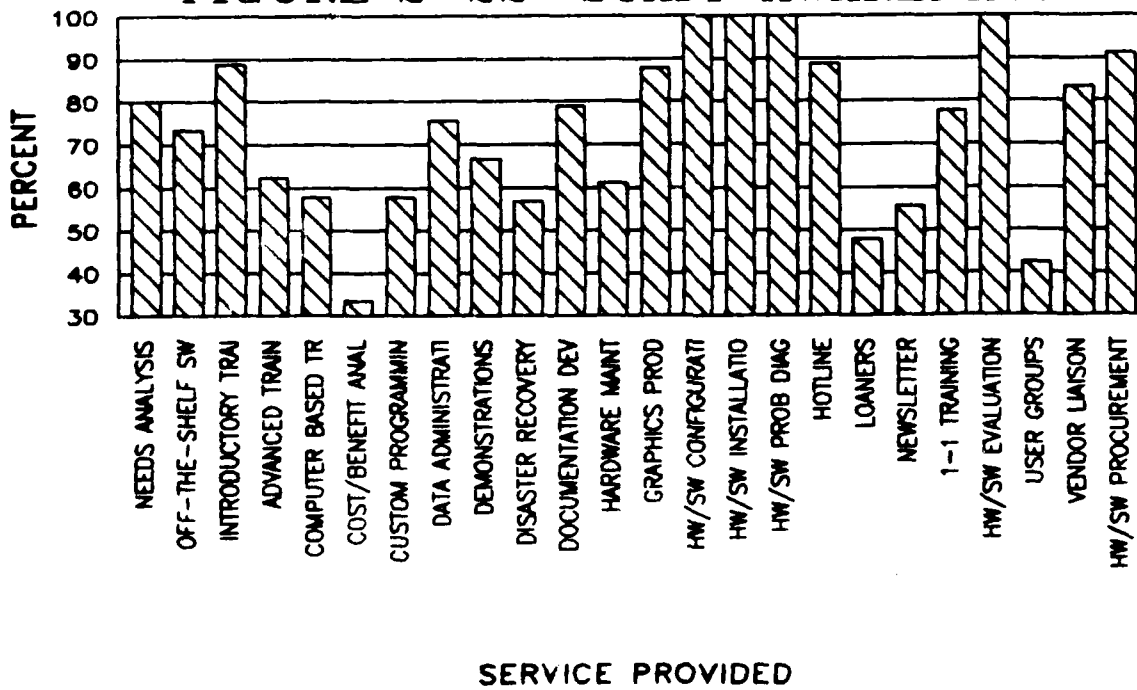


FIGURE 2-23 USER ADVICE SCALES

RANKINGS OF ADVICE SOURCES

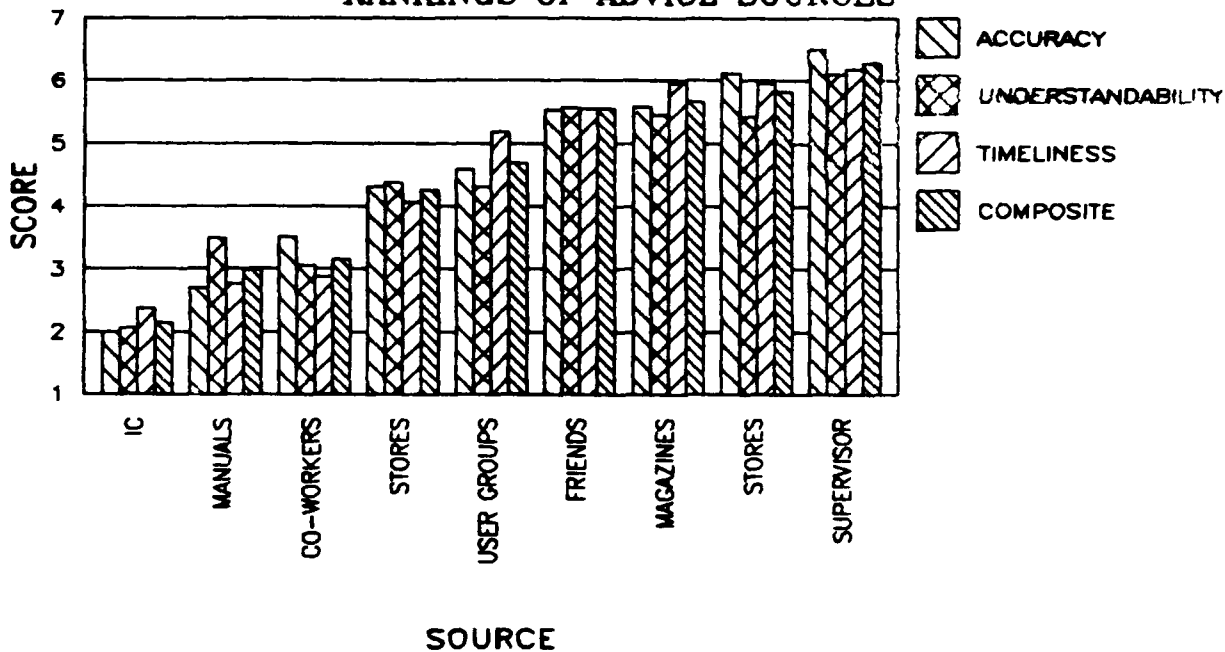
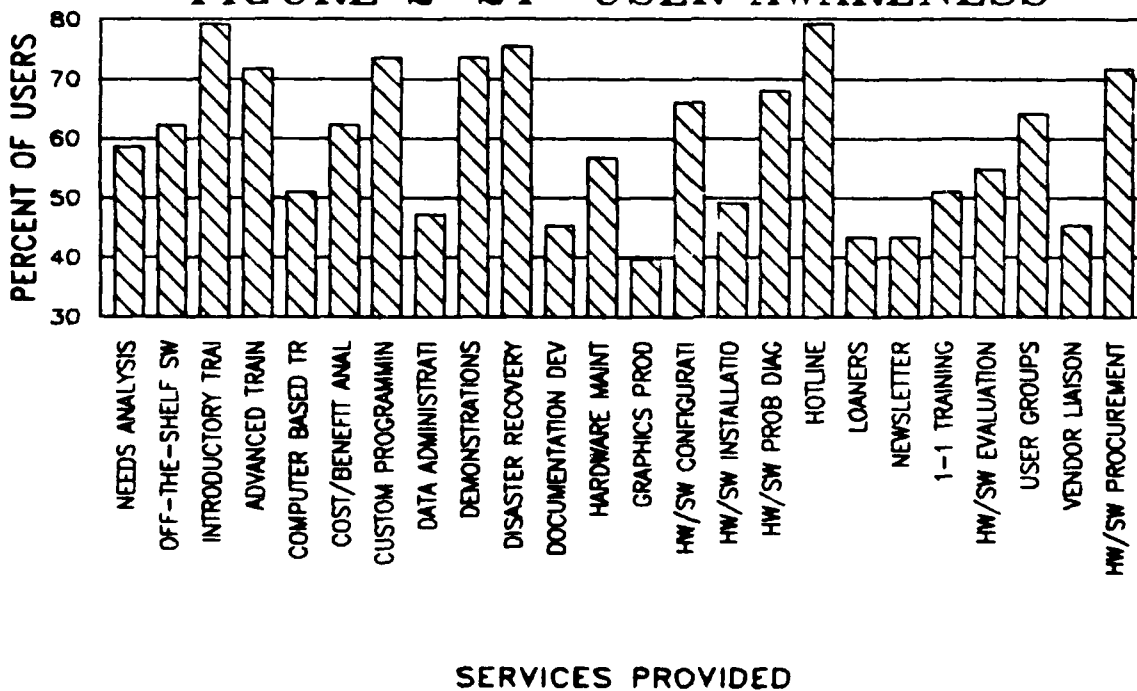


FIGURE 2-24 USER AWARENESS



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APPENDIX A

PROBLEM SOLVING/CONSULTING WORKSHOP

PLANNING, IMPLEMENTING, AND OPERATING THE INFORMATION CENTER

PROBLEM SOLVING/CONSULTING WORKSHOP

NOTES GROUP LEADERS

The leadership role during creative problem solving is strategic. The leader must be a facilitator of the group member's ideas. The leader must be careful to refrain from evaluative judgments during the process and serve mainly to keep the group moving ahead in their task. At the conclusion of the process it should be clear to everyone that the output is representative of the group's best thinking.

PLANNING, IMPLEMENTING, AND OPERATING THE INFORMATION CENTER

PROBLEM SOLVING/CONSULTING WORKSHOP

This activity is designed to acquaint you with a specific strategy for creative problem solving. This activity is built around the concept of brainstorming, where ideas are freely generated, regardless of how crazy they sound.

Using a set of worksheets, your team will proceed through a series of stages in the creative problem solving process. By recording the work of your team, it will be possible to retain the new ideas that the group is able to generate. These written records become the basis for further action after the creative problem solving group process is completed.

The worksheets will take your group through a five-step process. The five steps are:

FACT FINDING-- Identifying all of the "facts" that surround a particular problem.

PROBLEM FINDING-- Generating statements of the problem and agreeing on a single statement of the problem that will be the basis of the following steps.

IDEA FINDING-- Brainstorming ideas that have potential for resolving the problem.

SOLUTION FINDING-- Evaluating the ideas and deciding on which ideas have the most potential for solving the problem.

ACCEPTANCE FINDING-- Examining the possible problems in implementing the high potential ideas and outlining specific implementation steps.

Each step begins with an "expanding" function, such as brainstorming, and a "focusing" or narrowing function completes each step in which the ideas are chosen to carry forward to the next step.

Revised from material developed by Dr. Joseph S. Levine, Assistant Professor, Department of Administration and Higher Education, College of Education, Michigan State University.

WORKSHEET I

FACT FINDING

IN THE SPACES BELOW GENERATE AS MANY FACTS AS YOU CAN REGARDING THIS PROBLEM. Don't attempt to solve the problem at this time. Instead, focus your efforts on identifying as many facts as possible that surround the problem.

Complete this worksheet individually.

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

Fact

After completing the worksheet individually, have the recorder combine everyone's facts on one sheet.

Now, identify the most relevant facts and proceed to Worksheet II.

WORKSHEET I

FACT FINDING

QUESTIONS TO PROVOKE THE FACTS

What is the problem?

How does it happen?

How often does it happen?

When does it happen?

What causes the problem?

How long has it been a problem?

What is the scope of the problem?

Where is the problem?

Are people part of the problem?

Is a system or procedure part of the problem?

Are working conditions part of the problem?

Is communication part of the problem?

Are equipment and material part of the problem?

What is the history of the problem?

Who is involved?

Are there patterns or trends?

What is the price of not solving the problem?

Are there benefits to not solving the problem?

WORKSHEET II

PROBLEM FINDING

Now, define the problems that you feel exist based on the facts you have generated.

IN THE SPACES BELOW GENERATE AS MANY PROBLEM STATEMENTS AS POSSIBLE FROM THE FACTS THAT YOU HAVE PRODUCED. Use the phrase "In what ways may the IC..." as the beginning of your problem statements. When you've written a problem statement follow up by asking "why" and try to create another problem statement based on your "why" question (e.g. In what ways may the IC revise the training program." Why is it important to alter the program?--because attendance is falling, so..."In what ways can we improve attendance?" Why is it important to improve attendance? etc)

Complete the worksheet individually, first.

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

Problem Statement

After each member has listed some problem statements, the group recorder will list all of them, and the group will generate some additional ones.

WORKSHEET III

IDEA FINDING

IN THE SPACES BELOW LIST AS MANY IDEAS AS YOU CAN THINK OF TO SOLVE THE IDENTIFIED PROBLEM (Worksheet II). Defer making any judgment about the ideas—anything counts. If you bog down try:

ADAPTING an idea (What else is like this? What other ideas are suggested?)

MODIFYING an idea (Change meaning, color, form, etc.)

MAGNIFYING an idea (Make it stronger, larger, bigger, etc)

"MINIFYING" an idea (Make it smaller, split it up, subtract something, etc.)

REARRANGING an idea (Change the timing, sequence, layout, etc.)

COMBINING an idea (Pull two ideas together, add something new, etc.)

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

Idea

After each member of the group has had a chance to list some possible solutions, the recorder will combine the list and the group will add as many more ideas as possible.

WORKSHEET IV

GENERATING CRITERIA

You now have the five most promising ideas. Before you decide which idea is the best, you'll have to decide what criteria will be used in making the decision. So as a group, GENERATE AS MANY DIFFERENT CRITERIA THAT YOU CAN THINK OF FOR EVALUATING YOUR IDEAS (e.g. cost, time needed, staff involvement, acceptance by others, etc.) Have the recorder keep record.

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Criteria

Now, DECIDE ON THE "BEST" CRITERIA. TRY TO LIMIT YOUR SELECTION TO NO MORE THAN FIVE (5).

1. _____
2. _____
3. _____
4. _____
5. _____

Move on to Worksheet V, entering you criteria in the spaces across the top of the chart and place your five best ideas in the left-hand column. Using the rating scale provided, secure a cumulative score for each idea.

WORKSHEET VI

ACCEPTANCE FINDING

How will you actually implement your idea?

LIST ALL THE STEPS NECESSARY FOR ACTUALLY PUTTING YOUR IDEA INTO ACTION.
(Use the spaces on the left). Be sure to consider who, what, why, when,
how, and where.

Step 1	: Step 1a
Step 2	: Step 2a
Step 3	: Step 3a
Step 4	: Step 4a
Step 5	: Step 5a
Step 6	: Step 6a
Step 7	: Step 7a
Step 8	: Step 8a
Step 9	: Step 9a
Step 10	: Step 10a

Check over the steps you have listed. If you have forgotten something,
use the spaces on the right to add these steps.

THIS IS YOUR ACTION PLAN.

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APPENDIX B

IC MANAGER'S SURVEY.....B-01
IC STAFF SURVEY.....B-19
IC USER'S SURVEY.....B-43

IC MANAGERS SURVEY

Organization: _____

IC Manager/Director: _____

Telephone: (____) _____

I. BACKGROUND

1. When was the planning for your Information Center (IC) initiated?

2. When was the IC implemented ? -----

3. Were you, or are you, the first manager of the IC? _____ How long have you been in this position? -----

4. What was your assignment prior to this? -----

5. How much prior experience do you have in the following:

a. Computers in general? -----

b. Micro computers? -----

II. PLANNING

1. Which of the following activities or considerations were part of the planning process of your IC? Indicate the degree of importance given each using the scale below.

- 1 = primary importance
- 2 = major importance
- 3 = minor importance
- 4 = activity or consideration nor part of IC planning

- a. User needs surveys -----
- b. Physical location of IC -----
- c. Location of end-user assets -----
- d. Hardware/software to be supported -----
- e. Definition of IC responsibilities -----
- f. Selection of pilot projects -----
- g. Selection of initial user groups
to be supported -----
- h. Survey of training resources -----

2. If a "user needs" survey was conducted, what departments were surveyed? Which ones participated in the overall planning process?

- | | Surveyed | Participated |
|----------------|----------|--------------|
| a. DP/IRM | ----- | ----- |
| b. Admin | ----- | ----- |
| c. Operations | ----- | ----- |
| d. Finance | ----- | ----- |
| e. Personnel | ----- | ----- |
| f. Logistics | ----- | ----- |
| g. Other ----- | ----- | ----- |

3. Approximately how many microcomputers were in use in your organization prior to the establishment of your IC? How many now?

- | | Initially | Now |
|------------------|-----------|-------|
| a. 1 - 10 | ----- | ----- |
| b. 11 - 50 | ----- | ----- |
| c. 51 - 100 | ----- | ----- |
| d. More than 100 | ----- | ----- |

4. What strategies were selected for the implementation?

- a. Demonstrations for management -----
- b. Pilot project implementations -----
- c. Select group of users -----
- d. Open house -----
- e. Take all comers -----

5. How many users were to be supported by your IC at initial implementation? How many now?

	Initially	Now
a. 1 - 10	-----	-----
b. 11 - 50	-----	-----
c. 51 - 100	-----	-----
d. More than 100	-----	-----

III. MISSIONS/GOALS

1. Which of the following terms describe the missions of your IC at the time of its implementation? Indicate the degree of importance placed on each using the scale below:

- 1 = primary consideration, must be done now.
- 2 = major consideration, should be done now.
- 3 = minor consideration, should be done but deferred to later.
- 4 = not considered.

- a. Improve data processing/end-user relations -----
- b. Reduce data processing backlog -----
- c. Reduce external timesharing costs -----
- d. Increase end-user productivity -----
- e. Standardize microcomputer hardware/software -----
- f. Provide training in computer usage -----
- g. Assist end-users in identifying needs -----
- h. Evaluate new technology -----
- i. Other (describe briefly) -----

2. List the objectives of your IC and the strategies you are using to achieve these objectives.

A series of horizontal dashed lines provided for writing the objectives and strategies.

IV. IC ORGANIZATION

1. How large is the IC staff, including the manager? _____

2. Where were staff members assigned prior to their assignment to the IC? Enter number of staff members obtained from each:

- a. DP _____
- b. Finance _____
- c. Personnel _____
- d. Logistics _____
- e. Admin _____
- f. Operations _____
- g. Hired from Outside _____
- h. Consultant/Contractor _____

3. Which skills are most needed by an IC staff member? Indicate rank order:

- a. Technical DP skills _____
- b. Microcomputer hardware/software skills _____
- c. Inter-personal skills _____
- d. Training/presentation skills _____
- e. Problem solving skills _____

List additional skills you feel are critical:

4. What is the ratio of IC staff to end-users served?

Initially _____ : _____
 staff end
 users users

Now _____ : _____
 staff end
 users users

5. What is the internal organization of your IC?
- a. No subdivisions. Staff members are generalists, supporting all functions -----
 - b. More than one subdivision. Staff members specialize in one or more of the following:
 - (1) Timesharing/end-users on mainframe -----
 - (2) Microcomputer hardware/software products -----
 - (3) Training -----
 - (4) Hardware installation and maintenance -----
 - (5) Networking -----
 - (6) Mainframe/micro links -----
6. Which of the following activities occupy a significant part of your (the IC manager's) time? Indicate approximate percentage of your time spent on each applicable task:
- a. Establishing training plans:
 - (1) for staff members -----
 - (2) for end-users -----
 - b. Conducting IC tours and demos -----
 - c. Resolving conflicts with DP -----
 - d. Resolving conflicts with end-users -----
 - e. Preparing budget justifications -----
 - f. Reviewing end-user hardware/software requisitions -----
 - g. Procurement of hardware/software -----
 - h. Planning new initiatives -----
 - i. Scheduling IC staff utilization -----
7. Which of the following tasks consume a significant part of the IC staff's time? Indicate approximate percentage:
- a. User training -----
 - b. Hardware/software acquisition -----
 - c. Hardware/software evaluation -----
 - d. Maintenance of software library -----
 - e. Support of user groups -----
 - f. Consulting -----
 - g. Operation of IC equipment (Demos, etc.) -----
 - h. Hardware maintenance -----
 - i. Liaison with DP department -----
 - j. Hardware/software installation -----
 - k. Other (specify) -----

8. Which of the services listed below are currently being provided by your IC? Which of them do you plan to implement within the next year?

	Provided now	Plan to provide
Needs analysis	-----	-----
Application development (using off-the-shelf software)	-----	-----
Introductory training	-----	-----
Advanced training	-----	-----
Computer-based instruction	-----	-----
Cost-benefit analysis	-----	-----
Custom programming (using compilers or interpreters)	-----	-----
Data administration	-----	-----
Demonstrations in the IC (hardware/software)	-----	-----
Disaster recovery	-----	-----
Documentation development	-----	-----
Hardware repair and maintenance	-----	-----
Graphics production	-----	-----
Hardware/software configuration	-----	-----
Hardware/software installation	-----	-----
Hardware/software problem diagnosis	-----	-----
Hotline/trouble desk	-----	-----
Loaner equipment	-----	-----
Newsletter	-----	-----
One-on-one training	-----	-----
Hardware/software evaluations	-----	-----
User groups	-----	-----
Vendor liaison	-----	-----
Hardware/software procurement assistance	-----	-----

V. POLICIES OF THE INFORMATION CENTER

1. What types of hardware are supported by your IC?

- a. Time-sharing (in-house or external) -----
- b. Terminals linked to mainframe -----
- c. Stand alone microcomputers -----
- d. Microcomputer networks -----
- e. Microcomputer linked to mainframe -----

2. Which data access policies are supported by your IC?

- a. User must get own data -----
- b. IC provides data or provides access to data -----
- c. User has read access to central data -----
- d. User has read/write access to central data -----
- e. No specific policy - user department arranges with DP for access to central data -----

3. How much justification by end-users is required prior to acquisition of computing assets?

- a. Initial HW/SW purchase -----
- b. Each application -----
- c. None -----

4. Have you established written standards and procedures for the following?

a. Justifications by end-users for procurement of assets including:

- (1) Benefits -----
- (2) Life cycle costs -----
- (3) Relation to Information Systems Master Plans -----

b. Applications Documentation including:

- (1) Program maintenance manuals -----
- (2) Users manuals -----
- (3) Data requirement documents -----
- (4) Applications testing and validation -----

c. Information Resource Management including:

- (1) Data Security -----
- (2) Data privacy -----
- (3) Data accuracy and validity -----

- d. Back-up and recovery procedures including:
- (1) Application source files _____
 - (2) Data files _____
5. Have you initiated any form of charge-back for IC services? If so, indicate the services where charges are incurred.
- a. None _____
 - b. Acquisition of hardware _____
 - c. Acquisition of software _____
 - d. Installation of HW and SW _____
 - e. Data storage _____
 - f. Connect time to mainframe _____
 - g. Maintenance and repair _____
 - h. Application development _____
 - i. Consultant time _____
 - j. Training time _____
6. What is the degree of your IC's involvement in the procurement of hardware/software for the end-users?
- a. None _____
 - b. Review and advise end-users on requests for assets _____
 - c. Approve all requests _____
 - d. Perform procurement of all approved requests _____
7. What is the IC policy relative to hardware/software supported by the IC?
- a. Support only that which is on approved list _____
 - b. Support all _____
8. What is the policy relative to applications development using off-the-shelf software packages?
- a. IC assists with problem definitions _____
 - b. IC recommends software to be used _____
 - c. IC assists user in application development and maintenance _____
 - d. IC performs application development and maintenance _____
 - e. IC provides basic HW/SW, users responsible for all others _____

9. What is the IC policy relative to user application development using other than off-the-shelf software?

- a. Won't support _____
- b. Provide programming training _____
- c. Assist and advise users in development (programming) _____
- d. Develop (program) applications for users _____

10. Which training methods are most used in your IC?

- a. Self instruction by end-users using vendor manuals _____
- b. Classroom training by in-house trainers _____
- c. Hands-on training by in-house trainers _____
- d. Vendor operated training on-site _____
- e. Vendor operated training off-site _____
- f. Third party on-site/off-site _____
- g. Computer based training _____
- h. Video cassettes _____

VI. IC RECORDS

1. Which of the following types of records do you maintain (circle responses)?

- a. Visitor log sheet - keeps track of visitors to the IC and the purpose of their visits.
- b. Micro usage log sheet - keeps track of the use of the micros either in the IC or throughout the organization.
- c. IC activity log sheet - keeps track of what the IC staff is doing.
- d. IC contact log sheet - keeps track of memos, phone calls, and visits by the IC staff and the purpose of each.
- e. HW/SW inventory - Inventory of the hardware and software in the IC or throughout the organization.
- f. Other - Please be specific about the title of the instrument used to collect the data and the data collected.

(If available, please provide copies of the forms used to track any of the above information)

2. Which of the following types of documents do you publish?

- a. IC Newsletter
- b. IC Standards/Guidelines
- c. IC Procedures
- d. IC Resources Catalog
- e. IC Schedule of Events
- f. Procedures for acquiring HW/SW
- g. Other - Please be specific

(If available, please provide copies of the above documents)

VII. MANAGEMENT REPORTS

The Information Center is a staff and service activity. It usually has no end products of its own, and its success must come as a result of reports from its users and from regular routine reports of its progress measured against planned measured goals.

This check list covers the issues that relate to management reports. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the micro-computer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Are operations reports prepared routinely by the Information Center staff? -----
2. Are the following basic operating statistics produced routinely:
 - a. Resource utilization -----
 - b. Problems or incidents? -----
 - c. Daily operations, listing priorities? -----
 - d. Schedule adherence, both users and staff? -----
3. Are Resource Usage Accounting systems (e.g. MICROTRACK) being used on microcomputers, if they are available? -----
4. Are the following cost and personnel reports produced routinely:
 - a. Total cost and budget adherence? -----
 - b. Overhead costs for systems and support? -----
5. Are the following performance indicators calculated and reported:
 - a. Daily productive time and output? -----
 - b. Actual versus planned work volume? -----
 - c. Work quality or quality control reports? -----
6. Do the trouble or incident reports specify the particular trouble conditions for analysis and responsibility for corrective actions? -----
7. Are trouble or incident reports acted upon and followed up by management? -----
8. Is there a complete inventory list available of all hardware, software, and ancillary equipment? -----
9. Is there an adequate inventory control system to track necessary supplies to avoid stock-outs? -----

COMMENTS: -----

Preliminary Information Center Planning and Implementation Guide
Evaluation

Please help us evaluate the Preliminary Information Center Planning and Implementation Guided (IC P&I Guide) by completing this form. Your comments will help make the guide a more useful document for other Army installations.

1. When you first sat down with the IC P&I Guide did you
 ___ Read it from cover to cover
 ___ Look for specific information
 ___ Other: _____

2. Do you find the Guide is a useful resource, on that you have gone back to?
 ___ Yes
 ___ No

3. What information have you looked for in the Guide and found missing?

4. What do you think should be deleted from the Guide? _____

5. What should the Guide have more of? _____

6. What should the Guide have less of? _____

7. What is the most valuable part of the Guide? _____

8. What is the least valuable part of the Guide? _____

9. Did you find the guide readable?
___ Yes
___ No

10. Please rate the chapters of the Guide according to their helpfulness to you.

	Helpful			Not helpful	
a. Introduction	1	2	3	4	5
b. Background	1	2	3	4	5
c. Information Center Concept	1	2	3	4	5
d. Planning Phase	1	2	3	4	5
e. Implementation Phase	1	2	3	4	5
f. Operational Phase	1	2	3	4	5

11. Please make any comments or suggestions that you feel will make the Guide a better resource _____

IC STAFF SURVEY

Organization: _____

Name: _____

Telephone: () _____

1. How long have you been in this position? _____

2. What was your assignment prior to this? _____

3. How much prior experience do you have in the following:

a. Computers in general? _____

b. Micro computers? _____

4. Which of the following terms describe the missions of your IC?
Indicate the degree of importance placed on each using the scale
below:

a. Improve data processing/end-user relations _____

b. Reduce data processing backlog _____

c. Reduce external timesharing costs _____

d. Increase end-user productivity _____

e. Standardize microcomputer hardware/software _____

f. Provide training in computer usage _____

g. Assist end-users in identifying needs _____

h. Evaluate new technology _____

i. Other (describe briefly) _____

5. Where were you assigned prior to your assignment to the IC?

a. DP _____

b. Finance _____

c. Personnel _____

d. Logistics _____

e. Admin _____

f. Operations _____

g. Hired from Outside _____

h. Consultant/Contractor _____

6. Which skills are most needed by an IC staff member? Indicate rank order:

- a. Technical DP skills _____
- b. Microcomputer hardware/software skills _____
- c. Inter-personal skills _____
- d. Training/presentation skills _____
- e. Problem solving skills _____

List additional skills you feel are critical:

7. Which of the following tasks consume a significant part of the your time? Indicate approximate percentage:

- a. User training _____
- b. Hardware/software acquisition _____
- c. Hardware/software evaluation _____
- d. Maintenance of software library _____
- e. Support of user groups _____
- f. Consulting _____
- g. Operation of IC equipment (Demos, etc.) _____
- h. Hardware maintenance _____
- i. Liaison with DP department _____
- j. Hardware/software installation _____
- k. Other (specify) _____

8. Which of the services listed below are currently being provided by your IC? Which of them do you plan to implement within the next year?

	Provided now	Plan to provide
Needs analysis	-----	-----
Application development (using off-the-shelf software)	-----	-----
Introductory training	-----	-----
Advanced training	-----	-----
Computer-based instruction	-----	-----
Cost-benefit analysis	-----	-----
Custom programming (using compilers or interpreters)	-----	-----
Data administration	-----	-----
Demonstrations in the IC (hardware/software)	-----	-----
Disaster recovery	-----	-----
Documentation development	-----	-----
Hardware repair and maintenance	-----	-----
Graphics production	-----	-----
Hardware/software configuration	-----	-----
Hardware/software installation	-----	-----
Hardware/software problem diagnosis	-----	-----
Hotline/trouble desk	-----	-----
Loaner equipment	-----	-----
Newsletter	-----	-----
One-on-one training	-----	-----
Hardware/software evaluations	-----	-----
User groups	-----	-----
Vendor liaison	-----	-----
Hardware/software procurement assistance	-----	-----

9. What types of hardware are supported by your IC?
- a. Time-sharing (in-house or external) _____
 - b. Terminals linked to mainframe _____
 - c. Stand alone microcomputers _____
 - d. Microcomputer networks _____
 - e. Microcomputer linked to mainframe _____
10. Which data access policies are supported by your IC?
- a. User must get own data _____
 - b. IC provides data or provides access to data _____
 - c. User has read access to central data _____
 - d. User has read/write access to central data _____
 - e. No specific policy - user department arranges with DP for access to central data _____
11. How much justification by end users is required prior to acquisition of computing assets?
- a. Initial HW/SW purchase _____
 - b. Each application _____
 - c. None _____
12. Have you established written standards and procedures for the following?
- a. Justifications by end-users for procurement of assets including:
 - (1) Benefits _____
 - (2) Life cycle costs _____
 - (3) Relation to Information Systems Master Plans _____
 - b. Applications Documentation including:
 - (1) Program maintenance manuals _____
 - (2) Users manuals _____
 - (3) Data requirement documents _____
 - (4) Applications testing and validation _____
 - c. Information Resource Management including:
 - (1) Data Security _____
 - (2) Data privacy _____
 - (3) Data accuracy and validity _____
 - d. Back-up and recovery procedures including:
 - (1) Application source files _____
 - (2) Data files _____

13. Have you initiated any form of charge-back for IC services? If so, indicate the services where charges are incurred.

- a. None _____
- b. Acquisition of hardware _____
- c. Acquisition of software _____
- d. Installation of HW and SW _____
- e. Data storage _____
- f. Connect time to mainframe _____
- g. Maintenance and repair _____
- h. Application development _____
- i. Consultant time _____
- j. Training time _____

14. What is the degree of your IC's involvement in the procurement of hardware/software for the end-users?

- a. None _____
- b. Review and advise end-users on requests for assets _____
- c. Approve all requests _____
- d. Perform procurement of all approved requests _____

15. What is the IC policy relative to hardware/software supported by the IC?

- a. Support only that which is on approved list _____
- b. Support all _____

16. What is the policy relative to applications development using off-the-shelf software packages?

- a. IC assists with problem definitions _____
- b. IC recommends software to be used _____
- c. IC assists user in application development and maintenance _____
- d. IC performs application development and maintenance _____
- e. IC provides basic HW/SW, users responsible for all others _____

17. What is the IC policy relative to user application development using other than off-the-shelf software?

- a. Won't support _____
- b. Provide programming training _____
- c. Assist and advise users in development (programming) _____
- d. Develop (program) applications for users _____

18. Which training methods are most used in your IC?

- a. Self instruction by end-users using vendor manuals -----
- b. Classroom training by in-house trainers -----
- c. Hands-on training by in-house trainers -----
- d. Vendor operated training on-site -----
- e. Vendor operated training off-site -----
- f. Third party on-site/off-site -----
- g. Computer based training -----
- h. Video cassettes -----

19 Which of the following types of records do you maintain (circle responses)?

- a. Visitor log sheet - keeps track of visitors to the IC and the purpose of their visits.
- b. Micro usage log sheet - keeps track of the use of the micros either in the IC or throughout the organization.
- c. IC activity log sheet - keeps track of what the IC staff is doing.
- d. IC contact log sheet - keeps track of memos, phone calls, and visits by the IC staff and the purpose of each.
- e. HW/SW inventory - Inventory of the hardware and software in the IC or throughout the organization.
- f. Other - Please be specific about the title of the instrument used to collect the data and the data collected.

(If available, please provide copies of the forms used to track any of the above information)

20. Which of the following types of documents do you publish?

- a. IC Newsletter -----
- b. IC Standards/Guidelines -----
- c. IC Procedures -----
- d. IC Resource Catalog -----
- e. IC Schedule of Events -----
- f. Procedures for acquiring HW/SW -----
- g. Other - Please be specific -----

(If available, please provide copies of the above documents)

CENTRAL COMPUTER ACCESS CONTROL ISSUES

Access control is a key control in the microcomputer time-sharing environment. Access controls limit access to the computer, programs, and the data. Restricting access is dependent upon the capabilities built into the computer operating system. Some computers have a system which restricts access to those people possessing the correct passwords. Although this is normally a single-level control, it is better than no control at all. Access also should be restricted to data stored off-site. Organizations store backup data away from the microcomputer in case of a disaster. Should fire or other problems occur, the backup data permits the installation to regain operational status quickly.

The following check list relates to the issues involved in access control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each that the comment relates.

1. Does the operating system software of the central computer include access control? -----
2. Are procedures established to evaluate the access control features provided by hardware and software vendors to determine whether or not they should be utilized? -----
3. Is access to both data and programs determined? -----
4. Has a determination been made and enforced regarding who can have access to the central computer system facility? -----
5. Are central computer system access violations reported to management? -----
6. Have physical security measures been taken? -----
7. Are operators, systems programmers, and other computer data processing personnel subject to the same access rules as any other user of the system? -----

COMMENTS:

CONTINUITY OF OPERATIONS CONTROL ISSUES

The installation should determine the importance of microcomputer continuity of operation. Management should decide the number of hours, minutes, or days that the computer can be down without adversely impacting operations. This is the primary decision in determining the procedures to ensure continuity of operations. In microcomputer installations, it may be necessary to have two or more microcomputers to ensure continuity of operation. However, this may only be effective against hardware failures and not effective against other risks. Continuity of operation is important because it determines the amount of resources expended to ensure that operations continue.

This check list covers the control issues that relate to continuity of operations. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Have the operations which are needed for conducting the day-to-day work of the organization been identified? -----
2. Have procedures been established to ensure that those operations can be run on a timely basis? -----
3. Has sufficient data been stored off-site to ensure continuity of those operations in the event of a disaster? -----
4. Has sufficient documentation about the microcomputer operation been stored off-site so that processing can be continued in the event of a disaster? -----
5. Has a contingency plan been developed to restore operations in the event of a disaster? -----
6. Have the potential impacts of disasters been identified, and have sufficient countermeasures been incorporated into the contingency plan to offset such impacts? -----

COMMENTS:

COST-EFFECTIVENESS CONTROL ISSUES

Microcomputer systems are frequently installed because they are more cost-effective than other processing solutions. The determination of this cost-effectiveness requires the organization to determine or estimate both the benefits and the costs of installing a microcomputer. These benefits/costs can then be compared to other processing solutions. Few microcomputer installations go through a detailed benefit/cost analysis. The reason for this is that the cost of the microcomputer usually does not warrant an extended study. When all of the costs are accumulated, however, organizations may be surprised at the total costs associated with obtaining a microcomputer. Microcomputer installations need not go through the same detailed cost analysis performed by the large computer installation, they should perform a benefit/cost calculation, however. Without this calculation, many non cost-effective microcomputer installations may be made.

This check list covers the control issues that relate to cost-effectiveness. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does management require a benefit/cost study prior to acquiring a microcomputer system? -----
2. If so, have those procedures been followed? -----
3. Do the costs include documentation, training, site preparation, and other costs associated with installing a microcomputer? -----
4. Is a benefit/cost study made, even if analyzed in a cursory manner, prior to purchasing or installing a new application? -----
5. Are microcomputer users aware of the costs associated with using that equipment? -----
6. Are microcomputer users aware of the cost of alternate means of processing? -----
7. Are system applications and reports regularly reviewed to ensure that unneeded or obsolete systems or reports are eliminated? -----

COMMENTS:

CENTRAL COMPUTER SERVICE LEVEL CONTROL ISSUES

Central timesharing computers can easily become overloaded: their capacities are limited. When the capacity of the system is approached, the service level degrades quickly. In addition, some hardware commands and software capabilities may be inefficient. For example, some of the mathematical functions may take an excessive amount of time to execute. If the users are unaware of these inefficiencies, they may use capabilities which require an unreasonable amount of time for execution.

This check list covers the control issues that relate to central computer service level control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Are the resources adequate to handle the desired applications? -----
2. Has a procedure been established for prioritizing work when demand exceeds capacity? -----
3. Has a procedure been established for prioritizing work after a computer problem has caused down-time? -----
4. Has a procedure been established to prevent users from monopolizing resources? -----
5. Are service levels monitored to determine when system capacity action is needed? -----
6. Have procedures been established to determine what new capacity requirements will be placed on the central computer? -----
7. Is a job log maintained to determine where resources are being utilized? -----
8. Does a long-range capacity plan exist? -----
9. Are users regularly queried as to their level of satisfaction? -----

COMMENTS:

HARDWARE MAINTENANCE CONTROL ISSUES

Any piece of machinery can fail. When it does, service is needed. Vendors of small computers, or may not service their own computers. In addition, if they service the computer, they may not do it on-site. If vendor service is not readily available, third-party maintenance service should be arranged.

The questions below list the issues that relate the hardware maintenance. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the micro-computer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the Information Center offer maintenance service? -----
2. Is the service convenient to obtain? -----
3. Has the maximum permissible down-time been established? -----
4. Are the services provided within the maximum down-time? -----
5. Have procedures been developed for when and how to request maintenance services? -----
6. Are microcomputer users trained in how to perform routine maintenance? -----
7. Has the cost of maintenance been predetermined and budgeted? -----
8. Are logs maintained to show the amount of down-time? -----
9. Are third-party services for maintenance available? -----

COMMENTS:

HARDWARE RELIABILITY CONTROL ISSUES

Some microcomputers have self-diagnosing circuitry. When problems occur, the computer diagnoses its own problem and acts accordingly. Microcomputers without some of this diagnostic circuitry but, without the built-in circuitry to notify the user, the problem will not be detected.

The following check list addresses the issues associated with hardware reliability. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the vendor provide a guarantee on the reliability of the hardware? -----
2. Does the hardware have circuitry to identify hardware problems to the user? -----
3. Is the organization provided with a manual explaining testing the reliability of the hardware circuitry? -----
4. Is a hardware errors log maintained to help track the reliability of the hardware? -----
5. Are there procedures which specify who is to be called in the event of a hardware problem? -----
6. Is the reliability history of the microcomputer system evaluated prior to the purchase through reference to publications or a survey of existing users? -----

COMMENTS:

RECOVERY CONTROL ISSUES

Recovery is restoring the integrity of computer processing after it has been lost. Data integrity can be lost due to hardware failure, software failure, application system failure, operator error, or physical catastrophe. The problem may come quickly, resulting in a halt to computer operations, or erroneous processing may occur for an extended period of time before it is uncovered. Recovery is a two-part process: (1) retaining the necessary data and developing the procedures necessary to recover after a problem; and then (2) executing those procedures when required. The recovery process is deficient in many microcomputer installations. Most recovery procedures are learned the "hard way." The time and effort needed to develop a good recovery procedures is normally time well-spent.

This check list covers the control issues that relate to recovery control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a determination been made regarding which applications need to be recovered after a problem? -----
2. Has a determination been made regarding how quickly each application must be recovered? -----
3. Are resources available to meet the above time constraints? -----
4. Has sufficient backup data been saved to meet the above requirements and time constraints? -----
5. Have recovery procedures been established? -----
6. Have recovery procedures been practiced to determine that they are effective? -----
7. Are microcomputer users trained in recovery procedures? -----
8. Are recovery procedures documented? -----
9. Have arrangements been made for alternate processing, such as at another microcomputer site, in the event the microcomputer should be down for an extended period of time? -----

COMMENTS:

STANDARDIZATION CONTROL ISSUES

Microcomputer standards should exist in an organization. Some minimal standards should be established such as access standards. In most cases, the long-range direction for microcomputers is connection into a local area network. Without some long-range planning, organizations may acquire various microcomputers which are not compatible. When this happens, data from one computer cannot be readily transmitted or transferred between computers.

This check list covers the control issues that relate to standardization. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

- 1. Does the organization have a standard procedure for acquiring microcomputer hardware and software? -----
- 2. Can all of the installation's microcomputers communicate on the available network? -----
- 3. Are there certain vendor requirements, such as specific application programs, that must be met prior to acquiring a microcomputer system from that vendor? -----
- 4. Before it can become operational, does the microcomputer installation require operational programs to meet minimal standards advertised by the vendor? -----
- 5. Are data files adequately labeled to allow identification by an application prior to use? -----
- 6. Has one individual been appointed to oversee the microcomputer standards? -----

COMMENTS:

SOFTWARE MAINTENANCE CONTROL ISSUES

Software has the same types of problems as hardware. When problems occur, they need to be fixed. In some instances, the microcomputer user may have the source code of the software and, thus, may have the opportunity to fix the problem. In other instances, the vendor may refuse to release the source code, in which case the vendor must maintain the software package. When the microcomputer user relies upon a software package and it fails, it may need to be fixed quickly. Again vendor help service is required.

The following list of questions relate to the software maintenance issues which should be addressed. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the installation possess the necessary skills to maintain software developed in-house? -----
2. Has a procedure been developed to indicate when maintenance should be performed? -----
3. Do the vendors of the purchased software provide maintenance? -----
4. Is software maintenance convenient to obtain? -----
5. Has the cost of maintenance been determined? -----
6. Has the maximum desired down-time for software been determined? -----
7. Can software maintenance be provided within that maximum down-time period? -----
8. Are logs maintained to show the amount of down-time? -----
9. If down-time is excessive, can a refund or a re-negotiation of the contract be made with the vendor? -----
10. If the vendor goes out of business, is source code available for continuing modification of leased software packages? -----
11. If the software package vendor goes out of business, are the rights of the user protected? -----

COMMENTS: -----

SOFTWARE RELIABILITY CONTROL ISSUES

Quality software requires extensive testing. Testing is a very costly process; however without this testing software may fail, or, even worse, produce erroneous results without detection. Many microcomputer users rely heavily on vendor-produced system and application software; therefore, when software produces erroneous results, the users may not detect the problem, or they may be uncertain of the cause and/or correction. They must rely on outside help (IC or vendor), if it is available.

The list below asks questions relating to software reliability control issues. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has the degree of reliability desired in the software been determined? -----
2. Have tests been made to determine that the software achieves the predetermined degree of reliability? -----
3. Prior to purchase, have other users of purchased software been contacted to determine the reliability of the software? -----
4. If versions are changed, have backup versions been maintained in case the updated version proves unreliable? -----
5. Do developers of in-house software have the necessary skills to develop the software? -----
6. Are procedures established for software test and validation ? -----
7. Are software problem logs maintained to identify high-problem software? -----
8. Are procedures included in vendor or developer contracts to cope with software problems? -----

COMMENTS:

SYSTEMS DEVELOPMENT CONTROL CHECK LIST

Most end-users purchase application packages. Those who develop their own applications should take advantage of the time-tested techniques for developing systems properly. There is waste inherent in poor systems development. For example, it is far superior to follow the systems design process of defining requirements, developing system specifications, and then to do the programming and testing. In some microcomputer installations, users inefficiently begin the system development process by writing programs.

This check list covers the control issues that relate to systems development. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has an procedure been established to require management approval of applications before they are developed? -----
2. Has an procedure been established requiring management approval prior to purchasing computer applications? -----
3. Is the benefit/cost of an application determined prior to commencing the project? -----
4. Is a determination made if an application can be purchased prior to developing the application in-house? -----
5. Before integrating it within the microcomputer system, is a determination made whether the computer has sufficient capacity to execute the desired function? -----
6. Prior to approving the project, has it been determined that the proposed microcomputer system application can not be performed by another application system in the organization? -----
7. Do user microcomputer personnel possess the necessary skills to develop the application for the microcomputer? -----
8. Has a systems development procedure been established? -----
9. If so, is the complexity of the procedure related to the importance of the project? -----

COMMENTS: -----

SYSTEM DOCUMENTATION CONTROL ISSUES

Purchased or developed microcomputer applications may only have minimal documentation. The documentation provided by application system vendors varies significantly from outstanding to poor. Some systems have excellent, easy-to-read, easy-to-follow documentation, while others provide only the minimal documentation necessary. In addition, users developing their own applications frequently feel they do not need to document their work. Lacking adequate documentation, users may not be able to use the system effectively, to continue to use it (if the key user is transferred), or to modify the application economically.

The following check list addresses the issues associated with user application documentation. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a minimum level of documentation for microcomputer applications been established? -----
2. Is a minimum level of documentation required for purchased applications? -----
3. Are user instructions documented? -----
4. Does documentation exist concerning use of the outputs from the application? -----
5. Is there documentation on how to fix a problem in purchased applications? -----
6. Do purchased applications have documentation explaining how to get outside help? -----
7. Are the application controls documented? -----
8. Is documentation prepared in accordance with the importance of the application to the organization? -----

COMMENTS:

TRAINING CONTROL ISSUES

Users of microcomputers need training in the operation of both hardware and software. Many microcomputer vendors offer no formal training, and vendors may not supply self-study instructional material to help the user learn to use their hardware and software capabilities. Training then may become the function of the Information Center.

This check list contains the issues relating to training control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the Information Center provide training classes on the use of the microcomputer system (hardware)? -----
2. Are "self-teach" training materials available on the use of the microcomputer system (hardware)? -----
3. Are training courses and/or training material available for purchased software application packages? -----
4. Are procedures established to train users on in-house developed applications? -----
5. If a vendor goes out of business, does the organization own the rights to continue using the training courses? -----
6. If the vendor goes out of business, can the organization reproduce copy-righted materials for in-house use? -----
7. Are training materials updated when hardware, software, and in-house developed applications are updated? -----
8. Is the effort expended on training proportionate to the value of the trained resource to the organization? -----

COMMENTS:

AUDIT CONTROL ISSUES

Audit trails provide for the reconstruction of single-transaction processing and for the reprocessing of large amounts of data for recovery purposes. Audit trails can be created by the operating system or by application programming. The need for an audit trail may not be obvious to the microcomputer user. Many do not recognize the significant role of the audit trail. This, if coupled with the lack of or minimal audit trail aids provided by the vendor, can lead to some serious microcomputer processing reconstruction problems.

This check list covers the control issues that relate to audit trails. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a determination been made concerning which user applications require audit trails? -----
2. Have audit trails requirements been defined for each application that should have one? -----
3. Can all financial transactions be traced to their appropriate control totals? -----
4. Can financial control totals be traced downward to all the supporting transactions? -----
5. Have all the important transactions been identified? -----
6. Can the important transactions be reconstructed if necessary? -----
7. Are procedures established to log operator actions? -----
8. Are procedures established to reconstruct programs if necessary? -----
9. In a communication environment, have procedures been established to reconstruct communications processing if necessary? -----
10. In a database environment, have procedures been established to reconstruct database processing if necessary? -----
11. Is the audit trail's information sufficient to support the reconstruction of processing and requirements? -----

COMMENTS: -----

CONTROLLED APPLICATIONS PROCESSING ISSUES

A major issue is the control within applications processing. Controls are necessary to ensure that transaction processing is accurate, complete, and authorized. Without adequate controls the integrity of processing cannot be assured. Control in an application begins when the data is entered. Control assures the accuracy of input and processing, integrity of data files, and accuracy and completeness of output reports. In addition, control should prevent improper transactions from being processed.

This check list covers the control issues that relate to applications controls. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Are controlled risks identified? -----
2. Has the severity of those risks for the microcomputer applications been determined? -----
3. Are controls established to reduce the risks to an established level? -----
4. Are control violations documented and reported to management? -----
5. Does management take appropriate control violation actions on those control violations? -----
6. Are the controls documented? -----
7. Are the controls in the operating environment studied before building application controls? -----
8. Are the controls in purchased applications known? -----
9. Are the controls in purchased applications adequate? -----
10. If controls in purchased applications are inadequate, have steps been taken to improve those controls? -----

COMMENTS:

USER SATISFACTION CONTROL ISSUES

User satisfaction in a microcomputer installation may be difficult to measure. If end users are skilled and computer requirements are established in enough detail to be measurable, then user satisfaction can be measured. In many microcomputer installations, however, user expectations have not been defined, and, thus, are not directly measurable. Prior to approving the acquisition of a microcomputer system, the expectations for that computer should be defined and quantified. The results can then be measured against the requirements to determine achievement. In addition, end users should be queried concerning whether they are achieving their expectations (because their requirements may change). This may make the measurements against initial requirements inappropriate.

This check list covers the control issues that relate to user satisfaction. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Have the user's requirements been identified and documented? _____
2. Are those requirements measurable? _____
3. Have they been measured? _____
4. Have procedures been established to determine whether user requirements have been achieved? _____
5. As end user requirements change, are the methods of measuring user satisfaction changed accordingly? _____
6. Are end users periodically interviewed regarding whether the computer satisfies their needs? _____
7. Are procedures established to eliminate or change those systems which do not satisfy the user's needs? _____

COMMENTS:

IC USER'S SURVEY

This survey is being conducted as a part of the evaluation of the effectiveness of the INFORMATION CENTER (IC) at this installation. Your cooperation in this project is requested by completing this survey as accurately as possible. The results of this survey will be used to assist the IC in providing the types of services you need, wherever possible.

In this survey we will ask you about your use of microcomputers and your impressions of the support that you receive from your IC. We are interested in your response regardless of the amount of microcomputer experience you have or the amount of your contact with the Information Center. You were initially selected to participate in this survey because of your attendance at a training class at the IC. We are interested in determining if the training has assisted you in the performance of your job.

All of your answers to these questions will be held in confidence, with only members of the evaluation team having access to the specific answers you provide.

USER BACKGROUND

This part of the survey solicits information about your background as a microcomputer user, how you use computers on your job, and whether you have had any contact with the IC at this installation.

1. On the average, how much time do you spend per week working on a computer? Microcomputer _____ Mainframe _____

2. How long is your typical computer work session? _____

3. Please indicate your usage of the various computer applications listed below. Use a scale from 0 to 5 as shown below:

- 0 No use
- 1 Less than monthly
- 2 About once a month
- 3 Once weekly
- 4 Twice weekly
- 5 Daily

	Microcomputer	Mainframe
Electronic Mail	_____	_____
Word Processing	_____	_____
Database	_____	_____
Spreadsheet	_____	_____
Modeling/Simulation	_____	_____
Statistical Analysis	_____	_____
Computer Based Training	_____	_____
Data Communications	_____	_____
Graphics	_____	_____

4. Some users are not able to make maximum use of their microcomputer systems because of certain limitations. Which of the following would help you make better/more use of your system?

HARDWARE

- | | |
|-------------------------------------|----------------------------------|
| _____ More memory in computer | |
| _____ Hard disk | |
| _____ Larger hard disk | |
| _____ More convenient backup system | |
| _____ Better monitor | |
| _____ | _____ Graphics |
| _____ | _____ Enhanced graphics |
| _____ | _____ Color monitor |
| _____ | _____ Enhanced color monitor |
| _____ Modem | |
| _____ Plotter | |
| _____ Better printer | |
| _____ | _____ Better daisy wheel printer |
| _____ | _____ Better dot matrix printer |
| _____ | _____ Laser printer |
| _____ | _____ Color printer |

USER BACKGROUND

SOFTWARE

- Communications link to mainframe
- Interface between software packages (e.g., database to spreadsheet to graphics to word processing)
- Report generators
- Statistical packages (e.g., SPSS for micros)
- Decision support systems
- Windowing software for multi-tasking (e.g., Topview)
- Microcomputer networking and multi-user software
- Other -----

5. As a user of a microcomputer or mainframe system, you may have an awareness of additional knowledge you could use in your current job. Which of the following do you wish were true of you?

- To know how to program
- To know more about what hardware and software is available
- To know more about the technical details of the hardware
- More in-depth knowledge of the software I currently use
- To know more about how to use the mainframe

6. Which of the following factors describe your particular situation at work?

- Can't get enough time on the computer
- Can't get the computer I want
- Can't get funds to purchase computers
- Long delays in procuring equipment
- Can't get the training classes I want
- Can't get access to the data I need
- Can't get timely assistance

PC PRODUCTIVITY SURVEY

This section of the survey seeks to obtain an indication of the impact of training that you have received from the IC upon your microcomputer productivity. Please answer the following questions to the best of your knowledge.

1. Did you use a microcomputer prior to your classroom training? -----

2. What was your reason and/or objective for participating in the classroom training? -----

3. What impact did the training have on your ability to use a microcomputer? (Circle the appropriate answer)

NEGATIVE MODERATE POSITIVE OUTSTANDING

PC PRODUCTIVITY SURVEY

4. In what ways are you more productive and/or effective in performing your job? Please cite examples:

A series of horizontal dashed lines provided for writing answers to question 4.

PC PRODUCTIVITY SURVEY

5. Please list the routine tasks you now accomplish on a microcomputer and indicate the approximate change in the time required to accomplish these tasks.

	# HOURS PER WEEK		
	BEFORE MICRO	AFTER MICRO	TIME SAVED
-----	-----	-----	-----
-----	-----	-----	-----
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PC PRODUCTIVITY SURVEY

6. Please list the software packages you now use and indicate the approximate number of hours per week you use them.

PACKAGE	# HOURS PER WEEK

IC SERVICES ISSUES

1. Some of the services that an IC can provide are listed below. In the first column, check those services you believe are currently provided by the IC at this installation. Place a check in the second column if you currently utilize that service.

	SERVICES	
	PROVIDED	USED
Needs analysis	-----	-----
Application development (using off-the-shelf software)	-----	-----
Introductory training	-----	-----
Advanced training	-----	-----
Computer-based instruction	-----	-----
Cost-benefit analysis	-----	-----
Custom programming (using compilers or interpreters)	-----	-----
Data administration	-----	-----
Demonstrations in the IC (hardware/software)	-----	-----
Disaster recovery	-----	-----
Documentation development	-----	-----
Hardware repair and maintenance	-----	-----
Graphics production	-----	-----
Hardware/software configuration	-----	-----
Hardware/software installation	-----	-----
Hardware/software problem diagnosis	-----	-----
Hotline/trouble desk	-----	-----
Loaner equipment	-----	-----
Newsletter	-----	-----
One-on-one training	-----	-----
Hardware/software evaluations	-----	-----
User groups	-----	-----
Vendor liaison	-----	-----
Hardware/software procurement assistance	-----	-----

IC SERVICES ISSUES

2. In first column below, check the services that you believe are not now provided but which you feel you need at this time. In the second column check those services that you feel you will need within the next year.

	NEEDS	
	NOW	FUTURE
Needs analysis	----	----
Application development (using off-the-shelf software)	----	----
Introductory training	----	----
Advanced training	----	----
Computer-based instruction	----	----
Cost-benefit analysis	----	----
Custom programming (using compilers or interpreters)	----	----
Data administration	----	----
Demonstrations in the IC (hardware/software)	----	----
Disaster recovery	----	----
Documentation development	----	----
Hardware repair and maintenance	----	----
Graphics production	----	----
Hardware/software configuration	----	----
Hardware/software installation	----	----
Hardware/software problem diagnosis	----	----
Hotline/trouble desk	----	----
Loaner equipment	----	----
Newsletter	----	----
One-on-one training	----	----
Hardware/software evaluations	----	----
User groups	----	----
Vendor liaison	----	----
Hardware/software procurement assistance	----	----

MICROCOMPUTER ADVICE SCALES

DIRECTIONS: At the present time, you may be consulting various sources for advice concerning microcomputers and their use. Listed below are nine potential sources of advice concerning microcomputers. Please refer to these sources in answering the following questions.

POTENTIAL ADVICE SOURCES

- 1 = Immediate co-workers
- 2 = Your supervisor
- 3 = Instruction manuals (user's guides, etc.)
- 4 = User's groups or other professional clubs and organizations
- 5 = Commercial computer stores
- 6 = Trade journals, magazines, etc.
- 7 = Installation personnel other than immediate co-workers or IC personnel
- 8 = Friends, relatives, other people not employed on post
- 9 = Your Information Center

- 1. When you have a procedural problem with the application software you are using, from whom are you most likely to seek advice?
- 2. When you have a problem with the hardware or operating system software you are using, from whom are you most likely to seek advice?
- 3. If someone on the post inquires concerning assistance in using a microcomputer, who would you recommend they contact?

DIRECTIONS: Please rank each of the sources of advice shown below, in the order of the degree of ACCURACY of the information you typically receive from them. Use a rank order where one is the best and nine is the worst.

- Information Center personnel
- User's groups and professional clubs
- Friends and acquaintances not employed on post
- Immediate co-workers
- Instruction manuals (user's guides, etc.)
- Trade journals, magazines, etc.
- Commercial computer stores
- Installation personnel other than immediate co-workers
- Your supervisor

MICROCOMPUTER ADVICE SCALES

DIRECTIONS: Please rank each of the sources of advice shown below, in the order of the degree of UNDERSTANDABILITY of the information you typically receive from them. Use a rank order where one is the best and nine is the worst.

- Information Center personnel
- User's groups and professional clubs
- Friends and acquaintances not employed on post
- Immediate co-workers
- Instruction manuals (user's guides, etc.)
- Trade journals, magazines, etc.
- Commercial computer stores
- Installation personnel other than immediate co-workers
- Your supervisor

DIRECTIONS: Please rank each of the sources of advice shown below, in the order of the degree of TIMELINESS of the information you typically receive from them. Use a rank order where one is the best and nine is the worst.

- Information Center personnel
- User's groups and professional clubs
- Friends and acquaintances not employed on post
- Immediate co-workers
- Instruction manuals (user's guides, etc.)
- Trade journals, magazines, etc.
- Commercial computer stores
- Installation personnel other than immediate co-workers
- Your supervisor

TRAINING COURSE EVALUATION

Education and training are often one of the prime functions of the Information Center. This is not a small task. Microcomputer usage is spreading throughout the workplace, and the demand for training is increasing exponentially in most installations. This trend must be accommodated. The training objectives can only be attained if the courses provided meet the needs of the end users; therefore, periodic evaluations of the course content must be made.

The list of questions below relates to the issues addressed in the evaluation of the course content of the training provided by your IC. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates. Complete an evaluation for each training course you have taken.

1. Did the course address your specific needs? _____
2. Did the content of the course cover your requirements? _____
3. Was the course directly applicable to the hardware/software available in your organization? _____
4. Was the course attention-holding, interesting, and easy to understand? _____
5. Was the course interactive? _____
6. Did the course accommodate the range of student experience and interest? _____
7. Were there different presentation methods? _____
8. Were reinforcement and review techniques used? _____
9. Was a logical sequence of instructions used? _____
10. Did the learning steps cover concepts in logical order? _____
11. Was the course material accurate? _____
12. Was the use of graphics and visual aids appropriate? _____
13. Did the course provide hands-on use of the actual hardware and software? _____

COMMENTS: _____

TRAINING CONTROL ISSUES

Users of microcomputers need training in the operation of both hardware and software. Many microcomputer vendors offer no formal training, and vendors may not supply self-study instructional material to help the user learn to use their hardware and software capabilities. Training then may become the function of the Information Center.

This check list contains the issues relating to training control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the Information Center provide training classes on the use of the microcomputer system (hardware)? -----
2. Are "self-teach" training materials available on the use of the microcomputer system (hardware)? -----
3. Are training courses and/or training material available for purchased software application packages? -----
4. Are procedures established to train users on in-house developed applications? -----
5. If a vendor goes out of business, does the organization own the rights to continue using the training courses? -----
6. If the vendor goes out of business, can the organization reproduce copy-righted materials for in-house use? -----
7. Are training materials updated when hardware, software, and in-house developed applications are updated? -----
8. Is the effort expended on training proportionate to the value of the trained resource to the organization? -----

COMMENTS:

COST-EFFECTIVENESS CONTROL ISSUES

Microcomputer systems are frequently installed because they are more cost-effective than other processing solutions. The determination of this cost-effectiveness requires the organization to determine or estimate both the benefits and the costs of installing a microcomputer. These benefits/costs can then be compared to other processing solutions. Few microcomputer installations go through a detailed benefit/cost analysis. The reason for this is that the cost of the microcomputer usually does not warrant an extended study. When all of the costs are accumulated, however, organizations may be surprised at the total costs associated with obtaining a microcomputer. Microcomputer installations need not go through the same detailed cost analysis performed by the large computer installation, they should perform a benefit/cost calculation, however. Without this calculation, many non cost-effective microcomputer installations may be made.

This check list covers the control issues that relate to cost-effectiveness. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does management require a benefit/cost study prior to acquiring a microcomputer system? -----
2. If so, have those procedures been followed? -----
3. Do the costs include documentation, training, site preparation, and other costs associated with installing a microcomputer? -----
4. Is a benefit/cost study made, even if analyzed in a cursory manner, prior to purchasing or installing a new application? -----
5. Are microcomputer users aware of the costs associated with using that equipment? -----
6. Are microcomputer users aware of the cost of alternate means of processing? -----
7. Are system applications and reports regularly reviewed to ensure that unneeded or obsolete systems or reports are eliminated? -----

COMMENTS:

STANDARDIZATION CONTROL ISSUES

Microcomputer standards should exist in an organization. Some minimal standards should be established such as access standards. In most cases, the long-range direction for microcomputers is connection into a local area network. Without some long-range planning, organizations may acquire various microcomputers which are not compatible. When this happens, data from one computer cannot be readily transmitted or transferred between computers.

This check list covers the control issues that relate to standardization. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the organization have a standard procedure for acquiring microcomputer hardware and software? -----
2. Can all of the installation's microcomputers communicate on the available network? -----
3. Are there certain vendor requirements, such as specific application programs, that must be met prior to acquiring a microcomputer system from that vendor? -----
4. Before it can become operational, does the microcomputer installation require operational programs to meet minimal standards advertised by the vendor? -----
5. Are data files adequately labeled to allow identification by an application prior to use? -----
6. Has one individual been appointed to oversee the microcomputer standards? -----

COMMENTS:

SYSTEMS DEVELOPMENT CONTROL CHECK LIST

Most end-users purchase application packages. Those who develop their own applications should take advantage of the time-tested techniques for developing systems properly. There is waste inherent in poor systems development. For example, it is far superior to follow the systems design process of defining requirements, developing system specifications, and then to do the programming and testing. In some microcomputer installations, users inefficiently begin the system development process by writing programs.

This check list covers the control issues that relate to systems development. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has an procedure been established to require management approval of applications before they are developed? -----
2. Has an procedure been established requiring management approval prior to purchasing computer applications? -----
3. Is the benefit/cost of an application determined prior to commencing the project? -----
4. Is a determination made if an application can be purchased prior to developing the application in-house? -----
5. Before integrating it within the microcomputer system, is a determination made whether the computer has sufficient capacity to execute the desired function? -----
6. Prior to approving the project, has it been determined that the proposed microcomputer system application can not be performed by another application system in the organization? -----
7. Do user microcomputer personnel possess the necessary skills to develop the application for the microcomputer? -----
8. Has a systems development procedure been established? -----
9. If so, is the complexity of the procedure related to the importance of the project? -----

COMMENTS: -----

SYSTEM DOCUMENTATION CONTROL ISSUES

Purchased or developed microcomputer applications may only have minimal documentation. The documentation provided by application system vendors varies significantly from outstanding to poor. Some systems have excellent, easy-to-read, easy-to-follow documentation, while others provide only the minimal documentation necessary. In addition, users developing their own applications frequently feel they do not need to document their work. Lacking adequate documentation, users may not be able to use the system effectively, to continue to use it (if the key user is transferred), or to modify the application economically.

The following check list addresses the issues associated with user application documentation. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a minimum level of documentation for microcomputer applications been established? -----
2. Is a minimum level of documentation required for purchased applications? -----
3. Are user instructions documented? -----
4. Does documentation exist concerning use of the outputs from the application? -----
5. Is there documentation on how to fix a problem in purchased applications? -----
6. Do purchased applications have documentation explaining how to get outside help? -----
7. Are the application controls documented? -----
8. Is documentation prepared in accordance with the importance of the application to the organization? -----

COMMENTS:

HARDWARE RELIABILITY CONTROL ISSUES

Some microcomputers have self-diagnosing circuitry. When problems occur, the computer diagnoses its own problem and acts accordingly. Microcomputers without some of this diagnostic circuitry but, without the built-in circuitry to notify the user, the problem will not be detected.

The following check list addresses the issues associated with hardware reliability. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the vendor provide a guarantee on the reliability of the hardware? -----
2. Does the hardware have circuitry to identify hardware problems to the user? -----
3. Is the organization provided with a manual explaining testing the reliability of the hardware circuitry? -----
4. Is a hardware errors log maintained to help track the reliability of the hardware? -----
5. Are there procedures which specify who is to be called in the event of a hardware problem? -----
6. Is the reliability history of the microcomputer system evaluated prior to the purchase through reference to publications or a survey of existing users? -----

COMMENTS:

HARDWARE MAINTENANCE CONTROL ISSUES

Any piece of machinery can fail. When it does, service is needed. Vendors of small computers, or may not service their own computers. In addition, if they service the computer, they may not do it on-site. If vendor service is not readily available, third-party maintenance service should be arranged.

The questions below list the issues that relate the hardware maintenance. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the micro-computer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the Information Center offer maintenance service? -----
2. Is the service convenient to obtain? -----
3. Has the maximum permissible down-time been established? -----
4. Are the services provided within the maximum down-time? -----
5. Have procedures been developed for when and how to request maintenance services? -----
6. Are microcomputer users trained in how to perform routine maintenance? -----
7. Has the cost of maintenance been predetermined and budgeted? -----
8. Are logs maintained to show the amount of down-time? -----
9. Are third-party services for maintenance available? -----

COMMENTS:

SOFTWARE RELIABILITY CONTROL ISSUES

Quality software requires extensive testing. Testing is a very costly process; however without this testing software may fail, or, even worse, produce erroneous results without detection. Many microcomputer users rely heavily on vendor-produced system and application software; therefore, when software produces erroneous results, the users may not detect the problem, or they may be uncertain of the cause and/or correction. They must rely on outside help (IC or vendor), if it is available.

The list below asks questions relating to software reliability control issues. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has the degree of reliability desired in the software been determined? -----
2. Have tests been made to determine that the software achieves the predetermined degree of reliability? -----
3. Prior to purchase, have other users of purchased software been contacted to determine the reliability of the software? -----
4. If versions are changed, have backup versions been maintained in case the updated version proves unreliable? -----
5. Do developers of in-house software have the necessary skills to develop the software? -----
6. Are procedures established for software test and validation ? -----
7. Are software problem logs maintained to identify high-problem software? -----
8. Are procedures included in vendor or developer contracts to cope with software problems? -----

COMMENTS:

SOFTWARE MAINTENANCE CONTROL ISSUES

Software has the same types of problems as hardware. When problems occur, they need to be fixed. In some instances, the microcomputer user may have the source code of the software and, thus, may have the opportunity to fix the problem. In other instances, the vendor may refuse to release the source code, in which case the vendor must maintain the software package. When the microcomputer user relies upon a software package and it fails, it may need to be fixed quickly. Again vendor help service is required.

The following list of questions relate to the software maintenance issues which should be addressed. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Does the installation possess the necessary skills to maintain software developed in-house? -----
2. Has a procedure been developed to indicate when maintenance should be performed? -----
3. Do the vendors of the purchased software provide maintenance? -----
4. Is software maintenance convenient to obtain? -----
5. Has the cost of maintenance been determined? -----
6. Has the maximum desired down-time for software been determined? -----
7. Can software maintenance be provided within that maximum down-time period? -----
8. Are logs maintained to show the amount of down-time? -----
9. If down-time is excessive, can a refund or a re-negotiation of the contract be made with the vendor? -----
10. If the vendor goes out of business, is source code available for continuing modification of leased software packages? -----
11. If the software package vendor goes out of business, are the rights of the user protected? -----

COMMENTS: -----

CENTRAL COMPUTER ACCESS CONTROL ISSUES

Access control is a key control in the microcomputer time-sharing environment. Access controls limit access to the computer, programs, and the data. Restricting access is dependent upon the capabilities built into the computer operating system. Some computers have a system which restricts access to those people possessing the correct passwords. Although this is normally a single-level control, it is better than no control at all. Access also should be restricted to data stored off-site. Organizations store backup data away from the microcomputer in case of a disaster. Should fire or other problems occur, the backup data permits the installation to regain operational status quickly.

The following check list relates to the issues involved in access control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each that the comment relates.

1. Does the operating system software of the central computer include access control? -----
2. Are procedures established to evaluate the access control features provided by hardware and software vendors to determine whether or not they should be utilized? -----
3. Is access to both data and programs determined? -----
4. Has a determination been made and enforced regarding who can have access to the central computer system facility? -----
5. Are central computer system access violations reported to management? -----
6. Have physical security measures been taken? -----
7. Are operators, systems programmers, and other computer data processing personnel subject to the same access rules as any other user of the system? -----

COMMENTS:

CENTRAL COMPUTER SERVICE LEVEL CONTROL ISSUES

Central timesharing computers can easily become overloaded: their capacities are limited. When the capacity of the system is approached, the service level degrades quickly. In addition, some hardware commands and software capabilities may be inefficient. For example, some of the mathematical functions may take an excessive amount of time to execute. If the users are unaware of these inefficiencies, they may use capabilities which require an unreasonable amount of time for execution.

This check list covers the control issues that relate to central computer service level control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Are the resources adequate to handle the desired applications? -----
2. Has a procedure been established for prioritizing work when demand exceeds capacity? -----
3. Has a procedure been established for prioritizing work after a computer problem has caused down-time? -----
4. Has a procedure been established to prevent users from monopolizing resources? -----
5. Are service levels monitored to determine when system capacity action is needed? -----
6. Have procedures been established to determine what new capacity requirements will be placed on the central computer? -----
7. Is a job log maintained to determine where resources are being utilized? -----
8. Does a long-range capacity plan exist? -----
9. Are users regularly queried as to their level of satisfaction? -----

COMMENTS:

CONTROLLED APPLICATIONS PROCESSING ISSUES

A major issue is the control within applications processing. Controls are necessary to ensure that transaction processing is accurate, complete, and authorized. Without adequate controls the integrity of processing cannot be assured. Control in an application begins when the data is entered. Control assures the accuracy of input and processing, integrity of data files, and accuracy and completeness of output reports. In addition, control should prevent improper transactions from being processed.

This check list covers the control issues that relate to applications controls. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

- 1. Are controlled risks identified? -----
- 2. Has the severity of those risks for the microcomputer applications been determined? -----
- 3. Are controls established to reduce the risks to an established level? -----
- 4. Are control violations documented and reported to management? -----
- 5. Does management take appropriate control violation actions on those control violations? -----
- 6. Are the controls documented? -----
- 7. Are the controls in the operating environment studied before building application controls? -----
- 8. Are the controls in purchased applications known? -----
- 9. Are the controls in purchased applications adequate? -----
- 10. If controls in purchased applications are inadequate, have steps been taken to improve those controls? -----

COMMENTS:

CONTINUITY OF OPERATIONS CONTROL ISSUES

The installation should determine the importance of microcomputer continuity of operation. Management should decide the number of hours, minutes, or days that the computer can be down without adversely impacting operations. This is the primary decision in determining the procedures to ensure continuity of operations. In microcomputer installations, it may be necessary to have two or more microcomputers to ensure continuity of operation. However, this may only be effective against hardware failures and not effective against other risks. Continuity of operations is important because it determines the amount of resources expended to ensure that operations continue.

This check list covers the control issues that relate to continuity of operations. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Have the operations which are needed for conducting the day-to-day work of the organization been identified? -----
2. Have procedures been established to ensure that those operations can be run on a timely basis? -----
3. Has sufficient data been stored off-site to ensure continuity of those operations in the event of a disaster? -----
4. Has sufficient documentation about the microcomputer operation been stored off-site so that processing can be continued in the event of a disaster? -----
5. Has a contingency plan been developed to restore operations in the event of a disaster? -----
6. Have the potential impacts of disasters been identified, and have sufficient countermeasures been incorporated into the contingency plan to offset such impacts? -----

COMMENTS:

AUDIT CONTROL ISSUES

Audit trails provide for the reconstruction of single-transaction processing and for the reprocessing of large amounts of data for recovery purposes. Audit trails can be created by the operating system or by application programming. The need for an audit trail may not be obvious to the microcomputer user. Many do not recognize the significant role of the audit trail. This, if coupled with the lack of or minimal audit trail aids provided by the vendor, can lead to some serious microcomputer processing reconstruction problems.

This check list covers the control issues that relate to audit trails. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a determination been made concerning which user applications require audit trails? -----
2. Have audit trails requirements been defined for each application that should have one? -----
3. Can all financial transactions be traced to their appropriate control totals? -----
4. Can financial control totals be traced downward to all the supporting transactions? -----
5. Have all the important transactions been identified? -----
6. Can the important transactions be reconstructed if necessary? -----
7. Are procedures established to log operator actions? -----
8. Are procedures established to reconstruct programs if necessary? -----
9. In a communication environment, have procedures been established to reconstruct communications processing if necessary? -----
10. In a database environment, have procedures been established to reconstruct database processing if necessary? -----
11. Is the audit trail's information sufficient to support the reconstruction of processing and requirements? -----

COMMENTS: -----

RECOVERY CONTROL ISSUES

Recovery is restoring the integrity of computer processing after it has been lost. Data integrity can be lost due to hardware failure, software failure, application system failure, operator error, or physical catastrophe. The problem may come quickly, resulting in a halt to computer operations, or erroneous processing may occur for an extended period of time before it is uncovered. Recovery is a two-part process: (1) retaining the necessary data and developing the procedures necessary to recover after a problem; and then (2) executing those procedures when required. The recovery process is deficient in many microcomputer installations. Most recovery procedures are learned the "hard way." The time and effort needed to develop a good recovery procedures is normally time well-spent.

This check list covers the control issues that relate to recovery control. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Has a determination been made regarding which applications need to be recovered after a problem? -----
2. Has a determination been made regarding how quickly each application must be recovered? -----
3. Are resources available to meet the above time constraints? -----
4. Has sufficient backup data been saved to meet the above requirements and time constraints? -----
5. Have recovery procedures been established? -----
6. Have recovery procedures been practiced to determine that they are effective? -----
7. Are microcomputer users trained in recovery procedures? -----
8. Are recovery procedures documented? -----
9. Have arrangements been made for alternate processing, such as at another microcomputer site, in the event the microcomputer should be down for an extended period of time? -----

COMMENTS:

USER SATISFACTION CONTROL ISSUES

User satisfaction in a microcomputer installation may be difficult to measure. If end users are skilled and computer requirements are established in enough detail to be measurable, then user satisfaction can be measured. In many microcomputer installations, however, user expectations have not been defined, and, thus, are not directly measurable. Prior to approving the acquisition of a microcomputer system, the expectations for that computer should be defined and quantified. The results can then be measured against the requirements to determine achievement. In addition, end users should be queried concerning whether they are achieving their expectations (because their requirements may change). This may make the measurements against initial requirements inappropriate.

This check list covers the control issues that relate to user satisfaction. The list is designed to be answered "Yes" or "No." A "Yes" answer indicates the item of concern has been adequately addressed by the microcomputer installation. A "No" answer indicates that further investigation should be undertaken to determine the severity of the concern. A "Not Applicable (N/A)" answer may be used to indicate those items included on the check list which are not applicable for the organization being reviewed. The "Comments" section at the end of the check list is provided to qualify the "Yes" answers in which a concern is not completely satisfied, and to amplify the "No" areas. Indicate the question number to which each comment relates.

1. Have the user's requirements been identified and documented? -----
2. Are those requirements measurable? -----
3. Have they been measured? -----
4. Have procedures been established to determine whether user requirements have been achieved? -----
5. As end user requirements change, are the methods of measuring user satisfaction changed accordingly? -----
6. Are end users periodically interviewed regarding whether the computer satisfies their needs? -----
7. Are procedures established to eliminate or change those systems which do not satisfy the user's needs? -----

COMMENTS:

APPENDIX C
FORT STEWART

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APPENDIX C
FORT STEWART

1.0 BACKGROUND

Fort Stewart, Georgia is the home of the 24th Infantry Division, and has a population of 15,000 military and 2,600 civilians. An IC at Fort Stewart was officially implemented 1 October 1985 and encompasses the functions of the Automation Management Office (AMO). Many IC like services were offered before the official implementation of the IC. In keeping with the microcomputer focus of this guide, the analysis contained herein will center around the microcomputer end user support offered by the IC. This support has been offered since 1984. The interviews conducted and the subsequent analysis is related to the performance of the Microcomputer Section of the IC.

The IC is located in a controlled access facility, which somewhat restricts its accessibility. A log to the facility is maintained at the main entrance, but no information about the purpose of the visit is maintained. An IC contact log is manually maintained by the IC staff but logkeeping is of lower priority than other ongoing activities. There are no periodic reports made which would show the level of IC activity, problems encountered, degree of success in problem solution, or other performance factors. There is no standard procedure established for follow-up on unresolved problems reported to the IC, nor for soliciting feedback from the users regarding satisfaction with services provided.

1.1 PLANNING FACTORS

The implementation of the IC was based upon the results of the Fort Stewart Information Systems Planning (ISP) Study. The study was to determine all of the information systems requirements for the installation, including microcomputers and end user computing. All organizational units were involved in the study.

1.2 MISSION SELECTION

The missions of (1) increasing end user productivity, (2) providing standards for microcomputer use, and (3) providing training for end users in the use of microcomputers and microcomputer software, and (4) providing assistance to end users in developing applications on microcomputers for use in their workplaces, were given primary consideration when selecting the set of services to be provided by the IC.

1.3 SERVICES PROVIDED

Figure C-1 shows which services are currently being provided (height = 2) and those which will be provided in the near future (height = 1). No bar is shown for those services not provided or planned. All figures for this appendix are placed in the rear of the appendix, after all text. The services are defined below:

Assist end users in defining their computing needs,

Assist end users in developing application using off-the-shelf software,

Provide introductory training in the use of microcomputers and software (off-the shelf),

Provide advanced training for users in the utilization of their hardware and software,

Provide computer based training and tutorials to end users so that they may maintain their computer competence,

Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,

Provide custom programming assistance for end users developing microcomputer applications using other than off-the-shelf software,

Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

Provide training and assistance to end users in installation of their hardware and software,

Provide training and assistance to end users in diagnosing problems with their hardware and software,

Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users' hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

Coordinate the establishment of User Groups to foster the exchange of information within the user community of events of interest,

Provide liaison between the end users and microcomputer hardware and software vendors,

Assist the end user in the procurement of microcomputer assets.

2.0 ANALYSIS OF IC OPERATIONS

The results of the interviews conducted during the evaluation visits have been analyzed with respect to the topics discussed in Chapter 6 of the Planning and Implementation Guide. The following sections discuss the findings as they relate to Marketing the IC, On-Going Operations of the IC, and Evaluation of Support Provided to the user community.

Section 2.1 discusses the methods utilized to market the IC's services, and provides a primary measure of the effectiveness of these efforts.

On-Going Operations of the IC are discussed in Section 2.2. The discussion included information about the internal operation of the IC, and utilization of the staff. The discussion also covers training methods and records maintained by the IC.

The value of the IC as seen from the users viewpoint is presented in Section 2.3. The section includes; (1) discussion of expressed needs of the users in terms of hardware, software, and training; (2) check list responses; and (3) rating of the IC as a source of assistance and information about microcomputer usage.

2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation of a User's Manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

The only methods utilized by the IC at Fort Stewart are user groups and demonstrations.

The Fort Stewart User Group is scheduled to meet on the third Wednesday of each month during regular working hours. The stated purpose of the meetings is to:

"provide for information interchange, discussion of application developments, and any other items useful to the group as a whole."

All microcomputer users are invited to attend and anyone having an item of interest may have it placed on the agenda. Speakers are usually obtained for these meetings. The IC maintains a library of public domain software under the auspices of the user group. This software is available to users without charge. Users having an application that is of such general application that it may be utilized by other users in the group, are urged to submit the application for inclusion in the library. Forms and instructions for documentation and submission have been distributed to the user group members. Minutes of each meeting are distributed to all users, and may contain copies of other articles, notices, or announcements of general interest. Appendix F of the Planning and Implementation Guide contains examples of user group related correspondence. Demonstrations, other than to the user groups, are scheduled on an ad-hoc or as requested basis.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure C-2 shows the fraction of users interviewed that were aware of the status of each of the services. The figure shows that only about half of the users interviewed are aware of most of the services that are provided by the IC. Additional steps should be taken by the IC to increase their user community's awareness of the services that are provided, and to dispel the existing misconceptions regarding the services not being provided.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategies and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) Manual should be developed to document these requirements and provide ready reference for the staff.

2.2.1 IC Organization

There was not a promulgated SOP for the IC at Fort Stewart, nor were there any written mission statements with identifiable goals and objectives specific to the IC. It appeared that the IC was functioning on a day-to-day basis, merely responding to the daily pressures.

Under the 1985 reorganization of the Automation Management Office, the IC organization is defined as follows;

- a. Supervisor (1),
- b. Network Management Section (1),
- c. Microcomputer Section (1, with one additional due in July 1986, and 1 part-time),
- d. Interactive Applications Section (6),
- e. Viable Section (5),

where the number of personnel assigned is shown in parentheses after the section name.

2.2.2 IC Support Policies

The IC supports end users with a terminal on a mainframe computer or a stand alone microcomputer, and plans to initiate support for a network of microcomputers in the near future. It attempts to fully support software purchased from a list of recommended software and will support other software on a case basis. There are approximately 180 micros currently in use on Fort Stewart, all in a stand-alone mode. The micros represent approximately thirteen different models, and many more configurations. The IC has a backup machine in its demo area for most of the different models in use. This allows the staff to replicate a user's situation over the phone, expediting the problem solving process.

The IC is involved in the procurement of micros through the following: (1) determining technical configuration with the user, specifically, will it work as the user anticipates, and does it fit into the standard information architecture, (2) receiving the equipment and verifying that the proper items were received and that all are in proper working order, (3) issuing the hardware and software to the user, and (4) conducting a four hour introductory course at the time of delivery. In addition, the IC maintains an automated report entitled the DOIM DPI Inventory/Hand Receipt Report. This report lists all equipment and software with the associated costs and serial numbers. The IC maintains an application which defines various standard system configurations. These configurations are primarily based upon the items available on the standard GSA lists. Given a set of processing requirements, the application can print out a configuration listing showing the items to order, stock number, price, and provide an order total.

The IC provides the user with assistance in the definition of applications and embedded processing requirements, hardware and software configurations necessary, and with the development of the applications as required. The IC attempts to provide immediate support for the hardware and software it has recommended and/or purchased, but support for other hardware and software is given less priority. The IC does not get involved with assisting the users in gaining access to data contained in central computer data bases.

The IC conducts no user training other than a four hour introductory session training associated with the delivery of a system. Other methods of training reported as available include:

An omnibus software training course available through the Civilian Personnel Office. This course is very long (40 hours) and users have difficulty obtaining management approval to attend due to the length of the course.

Self instruction using the vendor provided manuals. The value of self instruction depends on the individual's motivation and dedication.

Tutorials and computer based training, either vendor or third party developed. This suffers from the same limitations as the self instruction.

2.2.3 Staff Awareness

There is an apparent lack of communication between the IC manager and the principle staff member regarding the services provided by the IC, as is shown in Figure C-3. These differences may stem from the lack of specific direction, or may be from a difference in judgment as to the degree of implementation of the services.

2.2.4 IC Staff Utilization

Figure C-4 shows the reported percentages of time spent on different tasks by the IC manager and by the principle staff member. Considering the fact that more than 80 percent of the managers time is spent on administrative tasks, and the fact that the staff assigned to mainframe related activities (12 versus 2 micro), leads to the suspicion that much of those administrative tasks are main frame oriented. The principle staff member reported spending half of his time consulting with users. Considering to the number of services, it is concluded that many of those activities are considered consulting by the staff member. It is also concluded that the time spent in introductory training of new users is included in the hw/sw installation task of the staff member.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

Figure C-5 depicts the fraction of users actually utilizing the IC's services. A phantom use is said to occur when a user reports having obtained the service and the IC manager reports that service as not provided. The total usage of the services as shown in this figure are in variance with the breakdown of staff time shown in Section 2.2.4. No explanation for the difference can be determined from the data obtained from the orientation or the evaluation visit.

Current support requirements are reflected in Figure C-6. The variable (cur-need) added to this plot depicts the case wherein the user reports a belief that the service is not provided and the IC manager reports the service as being provided, and the user reports that the service would be utilized if it were available. The addition of the cur-need inputs creates some demand for each of the services proposed. Those with a fraction greater than .5 should be given particular emphasis in the current operations of the IC.

The information contained in Figure C-7 tends to show the directions the IC should be moving if it is to meet the future demands for services. In this figure, an additional variable, fut-need, is added. A future need is defined as the case where the user indicates no need for the service at the present and can foresee that the need for the service will exist within the next year. The most significant of these future needs occurs in the area of one-on-one training.

2.3.2 Other User Needs

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in Figure C-8. The major complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired should be capable of easily developing report formats and extracting data from several different files with different characteristics.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure C-9 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. The interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using that software is needed.

2.3.3 Generic Software Used

Figure C-10 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are word processing and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas. Figure C-10 shows

that the most utilized types of software are word processing, spreadsheet, and data base.

2.3.4 Training

None of the users interviewed had received training from the IC, so no evaluation of the effectiveness of the training program can be obtained. Most of those interviewed either had prior experience with microcomputers or had taught themselves, using an instruction manuals. Nearly all users expressed a strong desire for training. The novice for introductory level so he can get started, and the more experienced user wants to learn advanced techniques to get the most out of his equipment.

2.3.5 Productivity Improvements

Significant productivity improvements through the use of computers in their workplace were reported by all five of the users interviewed. The improvements were stated in terms of reduction in the time required to complete a task, or in terms of tasks that could now be accomplished which could not have previously been done. Time reductions ranged from 1.5:1 to 10:1.

2.3.6 IC Advice Scales

Figure C-11 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The IC is ranked highest in all of the advice scales, and user groups second in accuracy and understanding. Co-workers are ranked second in timeliness. In terms of the assistance scales, more users selected the IC as the place to go for each category of assistance, indicating that the IC is held in high esteem for the assistance given to the users.

2.3.7 Control Issues

Half of the users interviewed expressed some knowledge of the control issues involved in end user computing, including the issues of system development, recovery control, and continuity of operations, but the general impression received was that this was something that should be done but it probably would not be done until directed to do so by higher authority.

FIGURE C-1 SERVICES PROVIDED

FORT STEWART

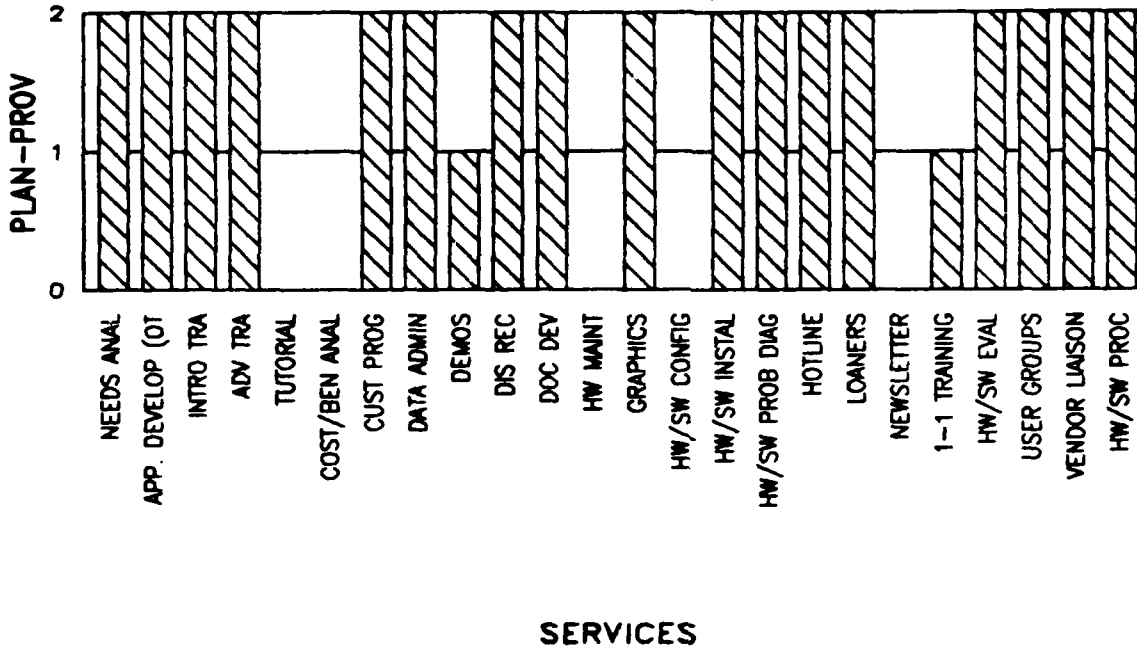
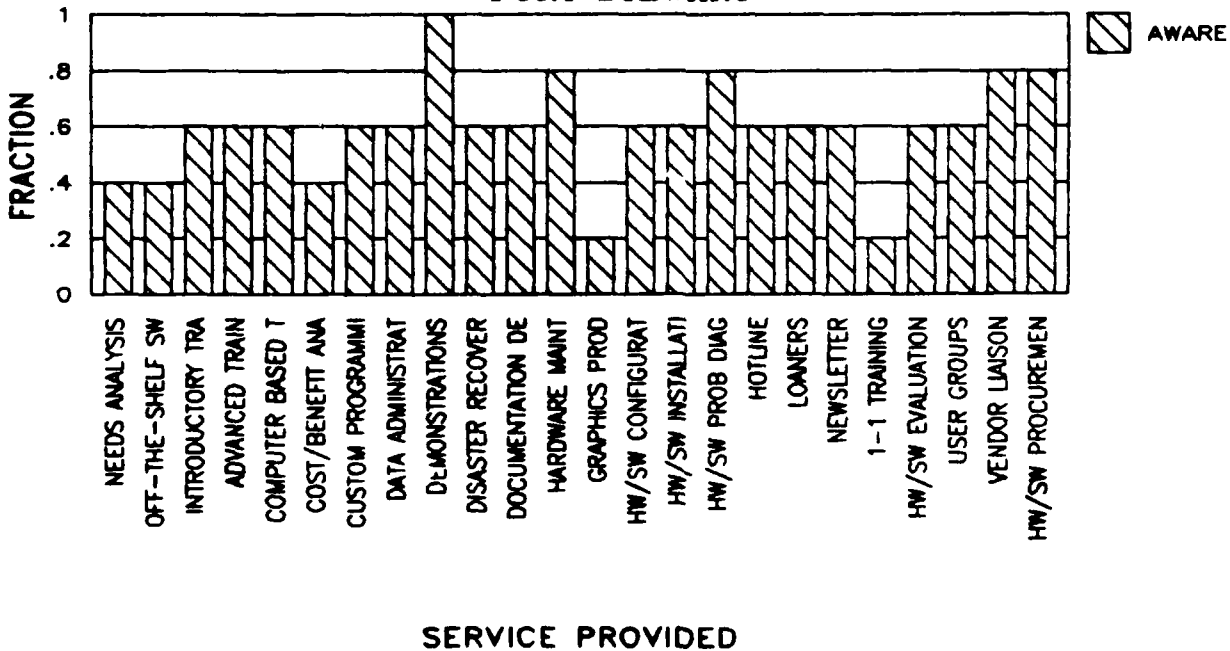


FIGURE C-2 USER AWARENESS

FORT STEWART



SERVICE	MANAGER STAFF	
NEEDS ANALYSIS	1	1
OFF-THE-SHELF SW	1	2
INTRODUCTORY TRAIN	1	2
ADVANCED TRAIN	0	2
COMPUTER BASED TRAINING	0	1
COST/BENEFIT ANAL	1	1
CUSTOM PROGRAMMING	1	2
DATA ADMINISTRATION	2	1
DEMONSTRATIONS	1	1
DISASTER RECOVERY	1	1
DOCUMENTATION DEV	0	2
HARDWARE MAINT	1	1
GRAPHICS PROD	0	1
HW/SW CONFIGURATION	1	1
HW/SW INSTALLATION	1	1
HW/SW PROB	1	1
HOTLINE	1	1
LOANERS	0	2
NEWSLETTER	2	2
ONE-ON-ONE TRAINING	1	1
HW/SW EVALUATION	1	1
USER GROUPS	1	1
VENDOR LIAISON	1	1
HW/SW PROCUREMENT	1	1

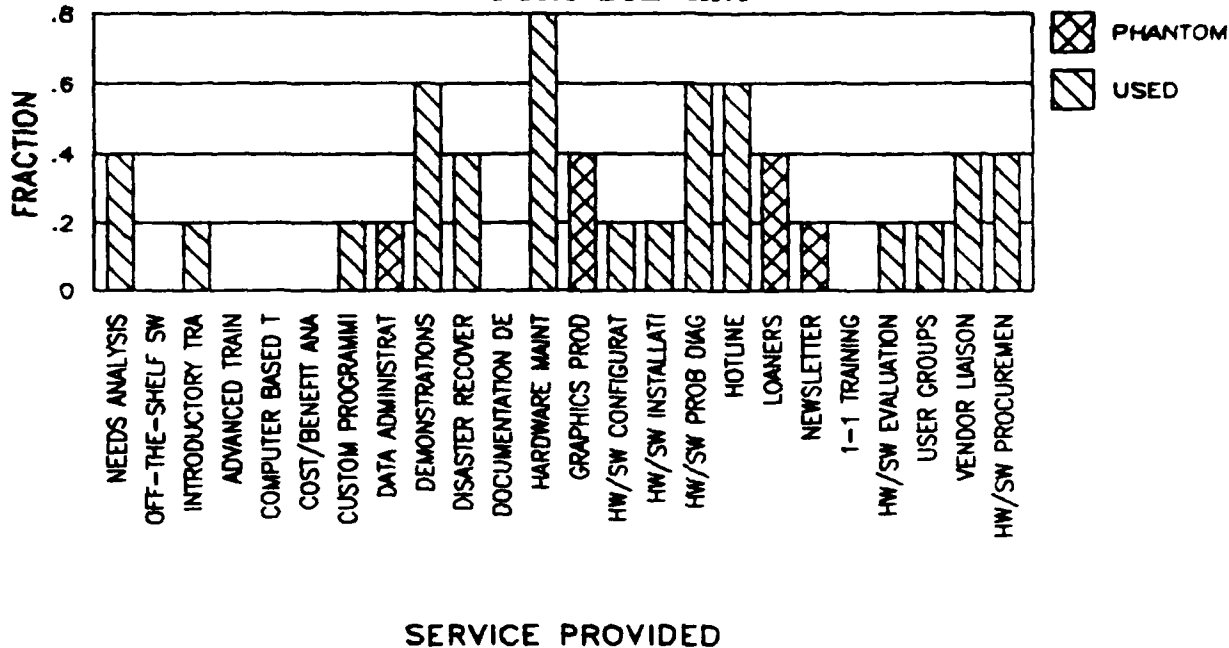
FIGURE C-3

IC MANAGER		STAFF	
TASK	PERCENT	TASK	PERCENT
STAFF TRAINING	5	USER TRAINING	0
USER TRAINING	2	HW/SW ACQUISITION	10
DEMONSTRATIONS	0	HW/SW EVALUATION	30
LIAISON WITH DP	0	SOFTWARE MAINTENANCE	0
LIAISON WITH USERS	0	(LIBRARY)	0
BUDGET PREPARATION	0	USER GROUPS	0
HW/SW REQUISITIONS	0	CONSULTING	50
PLANNING	0	DEMONSTRATIONS	0
SCHEDULING	10	HW MAINTENANCE	0
ADMINISTRATION	83	LIAISON WITH DP	0
		HW/SW INSTALLATION	10

FIGURE C-4

FIGURE C-5 SERVICE UTILIZATION

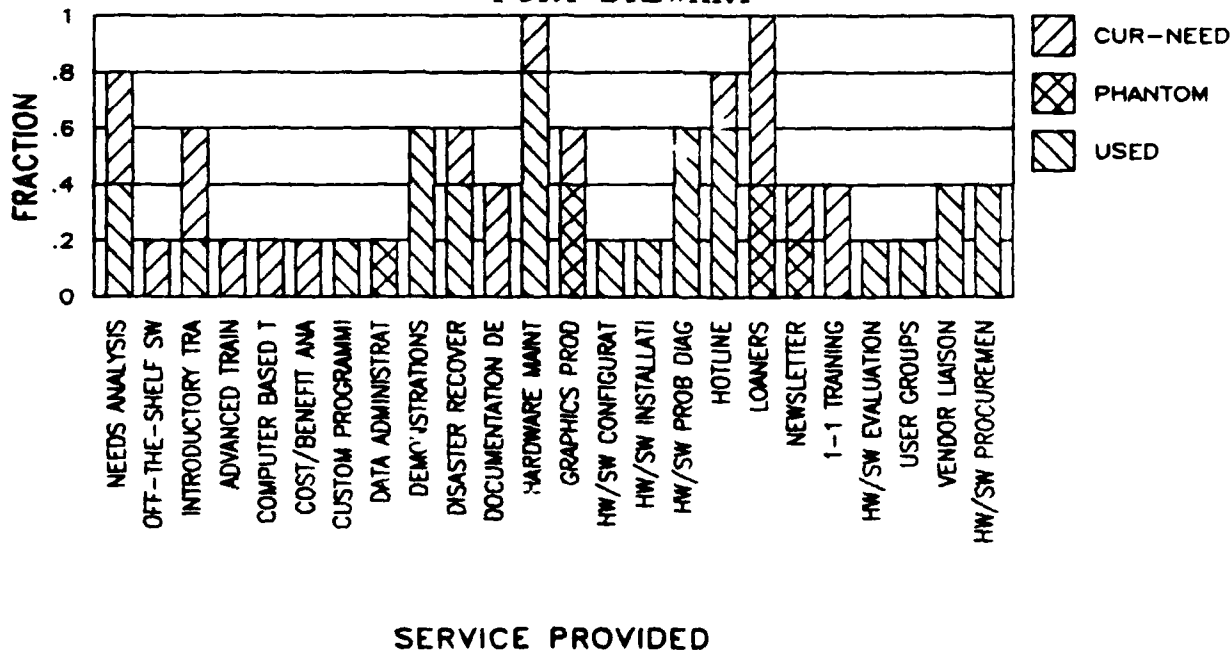
FORT STEWART



SERVICE PROVIDED

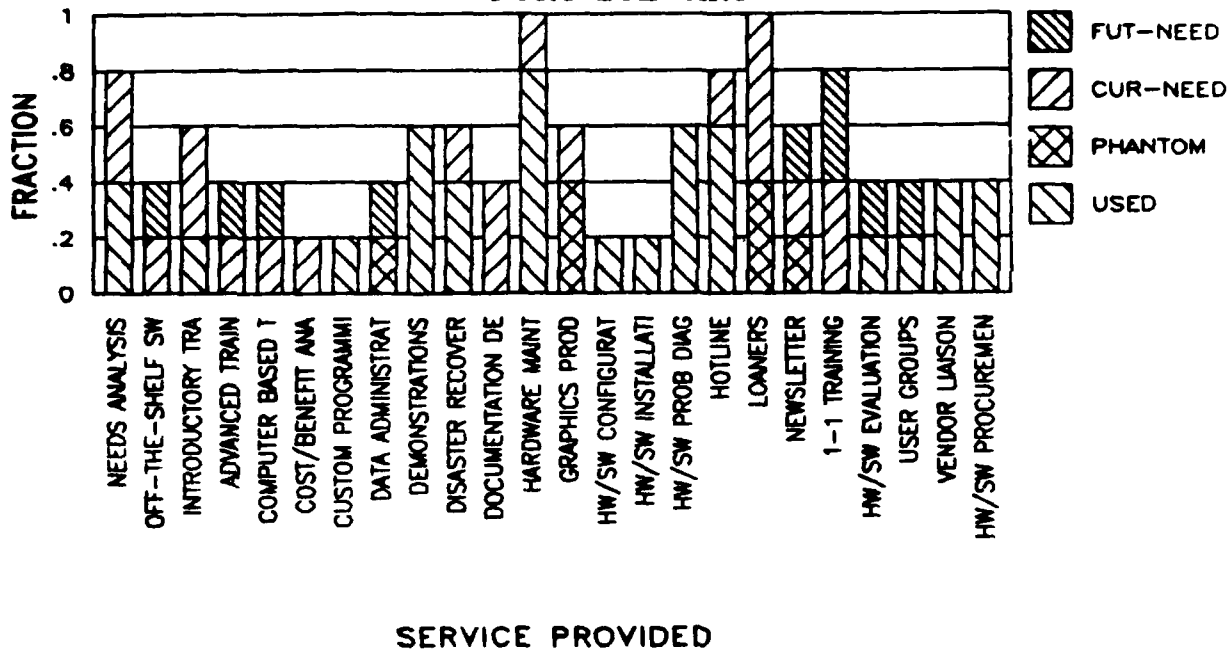
FIGURE C-6 CURRENT SERVICE REQUIREMEN

FORT STEWART



SERVICE PROVIDED

**FIGURE C-7 FUTURE SERVICE REQUIREMENT
FORT STEWART**



SERVICE PROVIDED

HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	40
HARD DISC	0
LARGER HARD DISC	0
MORE CONVENIENT BACKUP	60
BETTER MONITOR	40
MODEM	20
PLOTTER	20
PRINTER	60
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	40
SOFTWARE INTERFACE	60
REPORT GENERATOR	40
STATISTICAL PACKAGES	20
DECISION SUPPORT SYSTEM	20
WINDOWS	40
MICRO NETWORK	40

FIGURE C-8 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	80
2. NEW OFFERINGS	100
3. HARDWARE	80
4. SOFTWARE	100
5. MAIN FRAME	60

FIGURE C-9 KNOWLEDGE

CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
ELECTRONIC MAIL						80
WORD PROCESSING	60	20				80
DATA BASE	20	20	20			60
SPREADSHEET		20		20		40
STATISTICS					20	20
TUTORIALS			20		20	40
DATA COMMUNICATIONS				20		20
GRAPHICS				60		60
MAIN FRAME						
ELECTRONIC MAIL						
WORD PROCESSING						
DATA BASE		20				20
SPREADSHEET						
STATISTICS						
TUTORIALS						
DATA COMMUNICATIONS						
GRAPHICS						

FIGURE C-10 GENERIC SOFTWARE USE

ADVICE SCALES			
SOURCE	ACCURACY	UNDERSTANDING	TIMELINESS
IC	1.4	2.0	2.2
USER GROUPS	3.0	2.5	4.6
FRIENDS	6.7	6.3	5.5
CO-WORKER	3.6	2.8	2.6
MANUALS	3.6	5.0	4.0
MAGAZINES	6.5	6.3	7.4
STORES	5.5	5.0	5.6
OTHERS	5.6	5.6	6.2
SUPERVISOR	6.2	7.0	6.2

ASSISTANCE SCALES			
	PROCEDURAL	HW/SW	MICRO USE
IC	0.6	0.6	0.8
CO-WORKER	0.2	0.2	0.0
SUPERVISOR	0.2	0.2	0.0
USER GROUPS	0.0	0.0	0.2

FIGURE C-11 MICRO COMPUTER ADVICE

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APPENDIX D
FORT MONROE

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APPENDIX D
FORT MONROE

1.0 BACKGROUND

Fort Monroe, Virginia is the headquarters of the Army Training and Doctrine Command, and has a population of 1,200 military and 1,800 civilians. Their IC was officially implemented in July 1985; planning was initiated in May 1984. An implementation plan for the IC, or the Physical Information Center (PIC) as it is called there, was developed. A draft of that plan is found in Appendix F of the Planning and Implementation Guide.

The Fort Monroe IC is located in the Customer Support Division (CSD) of the Data Processing Field Office (DPFO). The IC is staffed by a combination of civilian and contractor personnel. Formal classroom training on microcomputer hardware and software is offered by the Training Branch, Application Systems Division, DPFO.

A single-user microcomputer standard has been identified for HQ TRADOC and Fort Monroe. The IC strongly supports this standard, and provides assistance to those using the standard products. Other, non-standard, products are in use, but the users are made aware that in-depth support may not be available on these products.

1.1 PLANNING FACTORS

The Planning for the IC was a part of a larger, more encompassing study to determine the needs for workplace automation. For the IC, determination of the hardware and software to be supported and definition of the IC's responsibilities were the primary factors considered. All departments were involved in the planning process.

1.2 MISSION SELECTION

The missions of (1) increasing end user productivity, (2) providing stands for microcomputer end user computing, (3) providing training for end users in the use of microcomputers and microcomputer software, and (4) providing assistance to the end users in developing microcomputer application, were given primary consideration when selecting the set of services to be provided by the IC.

1.3 SERVICES PROVIDED

Figure D-1 shows which services are currently being provided (height = 2) and those which will be provided in the near future. No bar is shown for the services not provided nor planned. All figures are placed in the rear of this appendix, after all text. The services are defined below:

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Provide computer based training and tutorials to end users so that they may maintain their computer competence,

Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,

Provide custom programming assistance for end users developing microcomputer applications using other than off-the-shelf software,

Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

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Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users' hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

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2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation of a User's Manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

Instead of a User's Manual, the IC has distributed a single-user microcomputer standard that has been identified for HQ TRADOC and Fort Monroe. The IC strongly supports this standard, and provides assistance to those using the standard products. Other, non-standard, products are in use, but the users are made aware that in-depth support may not be available for these products. In addition, several overviews of popular software packages have been developed and distributed to the users. The IC is planning to start a newsletter and User Groups within the next year.

The help/info desk was established in September 1983, to handle ADP related hardware, software, and communications problem calls. The IC has developed an automated help/info desk log, Information Center Events Processing System (ICEPS) to track the status of problems called in to the help/info desk. This log is updated daily; the daily logs are compiled into a weekly report. A monthly report is currently being developed. A sample copy of the daily log is found in Appendix F of the Planning and Implementation Guide.

The primary means of marketing the IC, and maintaining good relations with the user community is through use of Information Systems Officers (ISOs), who are located in the functional areas, and who have ADP knowledge. Users go to their ISO first when they have a problem, then if the problem cannot be resolved at that level, the ISO contacts the IC. The ISOs meet with the IC manager monthly. Information for the users concerning new technology, or improved IC services is passed to the ISOs at these monthly meetings. The status of all unresolved trouble calls, outstanding procurement and installation activities is also discussed at these meetings. Users also go through ISOs for ADP procurement requests.

Periodic demonstrations of new and existing hardware and software are conducted at the IC. The IC also has copies of many of the most popular software packages available so that a user may come in and "test drive" a given package before making the decision to buy.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure D-2 shows the fraction of the users that are aware of the true status of each of the services. The figure shows that about two-thirds of the users interviewed are aware of most of the services that are provided by the IC.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategies and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) manual should be developed to document these requirements and provide ready reference for the staff.

2.2.1 IC Organization

The Implementation Plan shown in Appendix F of the Planning and Implementation Guide was the primary vehicle for initiating the IC's operations. It contains definitions of the missions and functional responsibilities of the IC.

The following objectives and strategies have been defined for the IC:

Objective 1: Provide a central computer service to help maximize the use of automation services.

Strategy: Establish a help desk facility to handle user requests thereby providing a single point-of-contact to the user.

Objective 2: Develop a map and a phased schedule to automate HQ TRADOC offices in accordance with the priorities set by the DCSIM.

Strategy: Set up an automation functional requirements definition team that interfaces with the ISOs.

Objective 3: Provide a technology center which will allow HQ TRADOC to analyze available technologies and determine which is the best technology for its environment.

Strategy: Set up a Physical Information Center (PIC) facility to demonstrate, test, and evaluate new hardware, software, and communications equipment in cooperation with the end users.

Objective 4: Develop an education program which will enable HQ TRADOC personnel to utilize productivity tools and decisions support systems.

Strategy: In addition to the demos in the PIC and PROFS training, a formal microcomputer software (spreadsheet, database, graphics, etc.) training is established through the Training Centered.

Objective 5: Design and manage a HQ TRADOC telecommunications network.

Strategy: Undertake a project to interconnect department level minicomputers to microcomputers and host computers using lines, modems, multiplexers, LANs and dial-up facilities for PROFS.

Specific goals of the IC for the current year are expressed below.

1. Standardize software products for end user support.
2. Provide IC support services to HQ TRADOC customers.
3. Define hardware requirements to optimize programmer and end user productivity.
4. Develop a standard for electronic document distribution and coordination.
5. Develop a concept for providing graphics and statistical support to end users.
6. Provide a PC or terminal for every programmer.
7. Establish and train product specialists (in the popular software packages) in support of end users.
8. Write a Statement of Work (SOW) for securing contractor personnel for Help Desk, minicomputer operations, and direct end user support services.

Progress toward achieving these goals is measured with a planning/project management document that contains the milestones, dates and responsibilities. Monthly updates of the project are made to management and necessary corrective actions are initiated.

The IC has developed and promulgated a Standard Operating Procedures Manual. A copy of the Table of Contents is included in Appendix F of the Planning and Implementation Guide.

The Fort Monroe IC is staffed with 14 people in a combination of civil service and contractors. The IC is in the process of developing product specialists in the areas of word processing, spreadsheets, databases, project management, and graphics. Staff development, in order to create these specialists, has been emphasized.

2.2.2 IC Support Policies

The IC supports a broad range of mainframe users, linked minicomputers, and stand alone and networked micros. It has been the policy to support the hardware and software on the recommended list to the fullest extend possible, and support all others on a case basis.

The IC has implemented procedures so that the user can describe his functional requirements, and can be automated without the need to understand ADP acquisition or equipment configuration. An outline for the basic functional requirements for automation support is found in Appendix F of the Planning and Implementation Guide. The process includes the following steps: (1) define requirements; (2) IC recommends configuration; (3) submit documentation for approval; (4) submit request to procurement; (5) perform site survey; (6) equipment delivery; (7) inventory/hand receipt report to user; and (8) equipment installation.

The IC will provide assistance to a user wishing to develop an application using off-the-shelf software from defining the requirements, selecting the proper product and teaching development techniques. The IC will not do the development for the user. Similar assistance will be given to a user who wishes to create a custom program using one of the advanced languages if possible. The IC will also assist the user in obtaining access to data contained in mainframe data bases.

User training is conducted by the training branch of the DPFO. It consists primarily of in-house and/or contractor classroom training with emphasis on hands-on experience. One fourth of the users had taken at least one of the training courses, and felt that the impact of the training received was positive to outstanding. Another one fourth of those interviewed were not able to schedule training because of the class load.

IC staff members stress the value of data security, continuity of operations, audit control, development structure, and documentation of application when consulting with users. User responses to the same control issues indicate that they are not truly convinced that it is all required.

2.2.3 Staff Awareness

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in Figure D-3. The value of the "aware" variable is computed as the fraction of the staff members' responses that meet the awareness definition of awareness as defined in Section 2.1.2. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a breakdown in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementing stage.

The data shows that the IC staff is well aware of the status of services offered for all services except custom programming and disaster recovery.

Most of the staff members were aware of the IC's policies relative to hardware and software support, acquisitions, and application development using off-the-shelf software. The responses were more varied to queries about data access, development and documentation standards, data security, backup and recovery, and custom programming.

2.2.4 IC Staff Utilization

The utilization of personnel in the IC is shown Figure D-4. It shows the IC manager's estimate of the percent of his time is spent in each of the task areas. In Figure D-5, the IC manager's estimate of the percent of total time spent by his staff is compared to the normalized total percent of time calculated from the individual staff members estimates of their utilization, and is an estimate of the IC manager's feel for what tasks are taking up his staff's time. An indication of the assignment of special interest of a particular staff member is given by the percent of time that is spent on the different tasks.

Figure D-5 provides an estimate of the degree to which the IC manager is kept aware of the tasks that occupy the most of their staff's time. The spread in the percent of time spent on different tasks by different staff members is believed to stem from the different functional responsibilities assigned to those staff members.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

Figure D-6 depicts the fraction of users actually utilizing the IC's services. A phantom use is said to occur when a user reports having obtained the service and the IC manager reports that no such service was provided.

Current support requirements are reflected in Figure D-7. The variable (cur-need) added to this plot depicts the case wherein the user reports a belief that the service is not provided and the IC manager reports the service as being provided, and the user reports that the service would be utilized if it were available. The addition of the cur-need inputs creates some demand for each of the services proposed. Those with a

fraction greater than .5 should be given particular emphasis in the current operations of the IC.

The information contained in Figure D-8 tends to show the direction the IC should be going if it is to meet the future demands for services. In this figure, an additional variable, fut-need, is added. A future need is defined as the case where the user indicates no need for the service at the present time, but can foresee the need within the next year. The most significant of these future needs occurs in the area of one-on-one training.

2.3.2 Other User Needs

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in Figure D-9. The major complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired should be capable of easily developing report formats and extracting data from several different files with different characteristics.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure D-10 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. The interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using that software is needed.

2.3.3 Generic Software Used

Figure D-11 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are word processing and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas.

2.3.4 Training

Three out of twelve received training from the IC. The training was rated positive to outstanding. Most of the users had previous experience with micros. Nearly all users expressed a strong desire for training. The novice for introductory level so he can get started, and the more experienced user wants to learn advanced techniques to get the most out of his equipment.

2.3.5 Productivity Increase

Six of the twelve users interviewed reported significant productivity improvements through the use of computers in their workplace. The improvements were stated in terms of reduction in the time required to complete a task, or in terms of tasks that could now be accomplished which could not have previously been done. Time reductions ranged from 1.5:1 to 10:1. These benefits were related primarily to spreadsheet and word processing applications.

2.3.6 IC Advice Scales

Figure D-12 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The IC, co-workers, and manuals all ran significantly higher than the other sources, and co-workers rank highest in timeliness. This result tends to show that a user is more prone to seek immediate assistance from a knowledgeable co-worker first, then going to the IC or the manual if the co-worker is not available or doesn't know the answer. The same trend is shown in the assistance scales. This suggests that one way to reduce some of the "nuisance" type trouble calls would be to cultivate a knowledgeable user in each department, concentrate on the training of this person, and

expecting this person to become the advisor for that department for routine assistance (i.e. minor problems not involving an inordinate amount of the expert's time).

2.3.7 Control Issues

Users interviewed who were Wang word processor users or used terminals from a mainframe (or mini) were well aware of the Central Computer Control Access and service level issues. Backup and recovery issues were for the most part, on a non-scheduled basis. Most backup data and program discs were not physically remote from the workstation. Continuity of operation had not occurred to most, nor had documentation of their applications.

FIGURE D-1 SERVICES PROVIDED

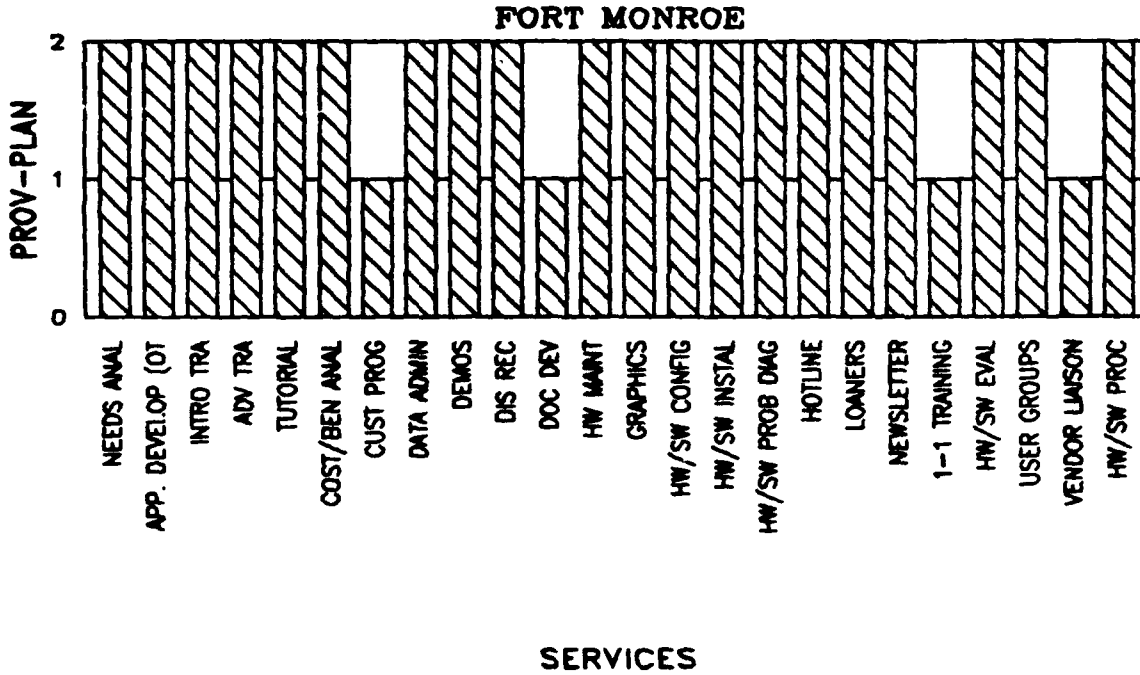
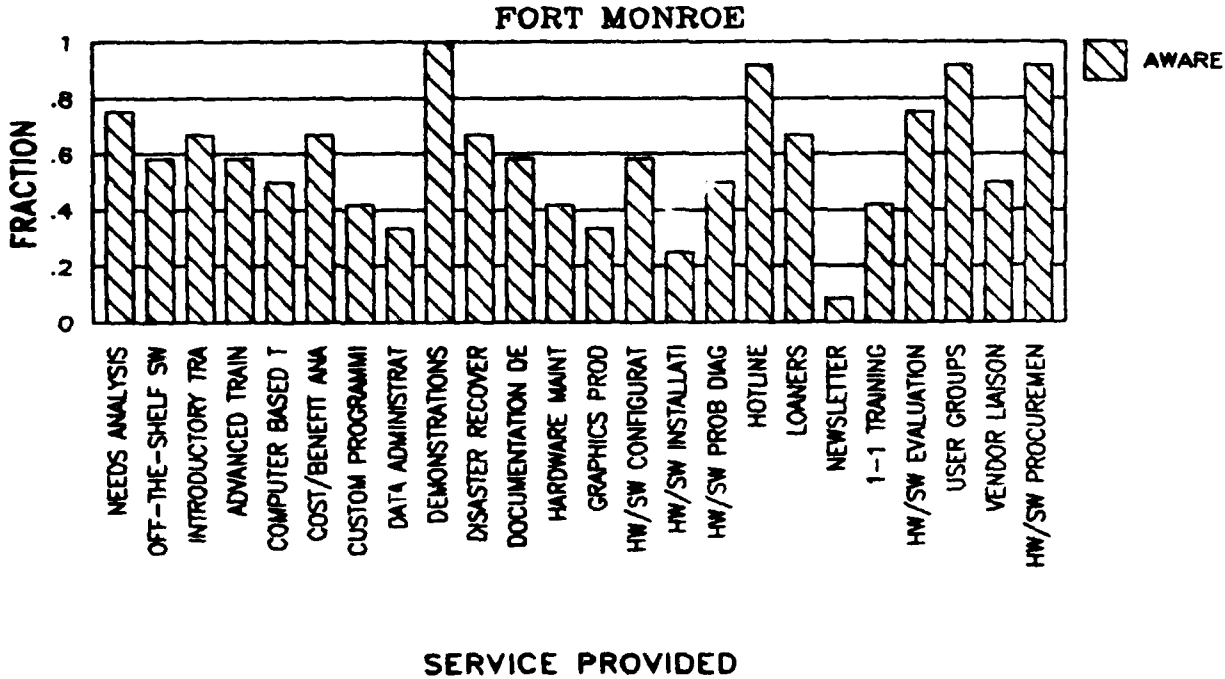
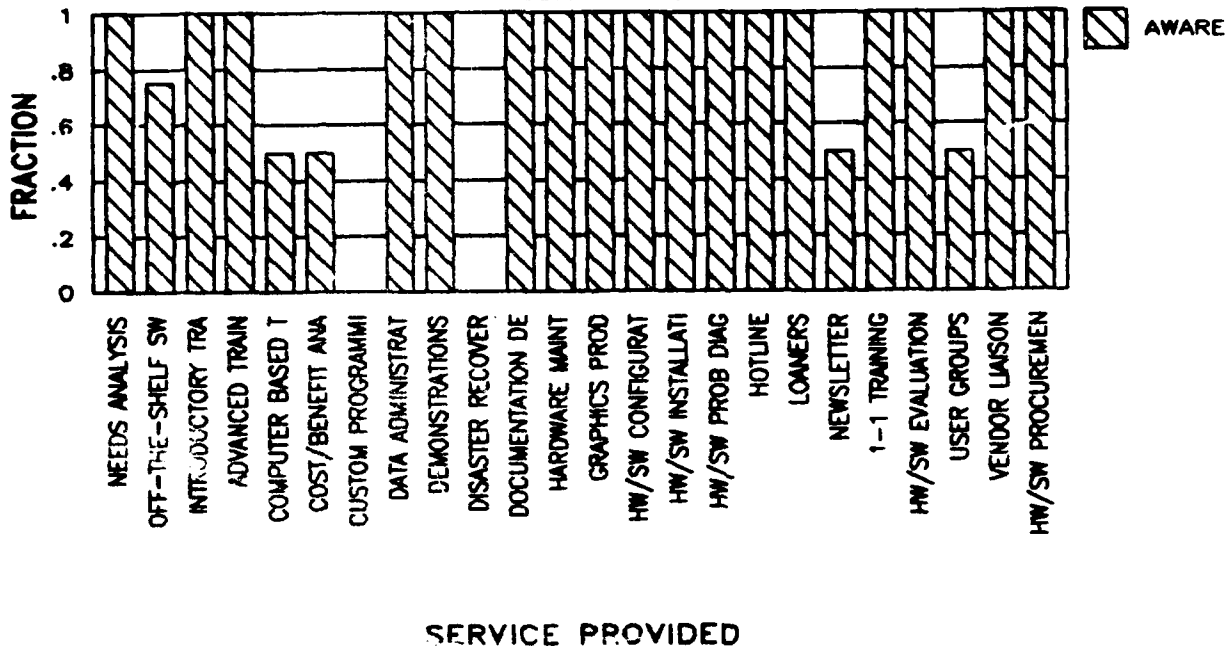


FIGURE D-2 USER AWARENESS



**FIGURE D-3 STAFF AWARENESS
FORT MONROE**



SERVICE PROVIDED

IC MANAGER	
TASK	PERCENT
STAFF TRAINING	5
USER TRAINING	5
DEMONSTRATIONS	11
LIAISON WITH DP	11
LIAISON WITH USERS	11
BUDGET PREPARATION	6
HW/SW REQUISITIONS	22
PLANNING	5
SCHEDULING	17
ADMINISTRATION	6

FIGURE D-4 IC MANAGER TIME DISTRIBUTION

STAFF						
STAFF TASK	IC MGR EST.	AVG EST.	STAFF 1 EST.	STAFF 2 EST.	STAFF 3 EST.	STAFF 4 EST.
USER TRAINING	16.8	1.3	4.0	.0	.0	1.0
HW/SW ACQUIS'N	15.3	22.8	15.0	26.0	.0	50.0
HW/SW EVALUATION	3.5	11.7		5.2	.0	30.0
SW LIBRARY	3.5	.0		.0	.0	.0
USER GROUPS	3.5	.3		.0	.0	1.0
CONSULTING	3.5	22.7	60.0	20.8	.0	10.0
DEMONSTRATIONS	7.1	1.5	5.0	.0	.0	1.0
MAINTENANCE	3.5	.0		.0	.0	.0
LIAISON WITH DP	7.1	3.6	5.0	8.3	.0	1.0
HW/SW INSTALL	10.6	.5	1.0	.0	.0	1.0
PROB SOLUTION	3.0	13.6	10.0	39.6	.0	5.0

FIGURE D-5 STAFF UTILIZATION

FIGURE D-6 SERVICE UTILIZATION
FORT MONROE

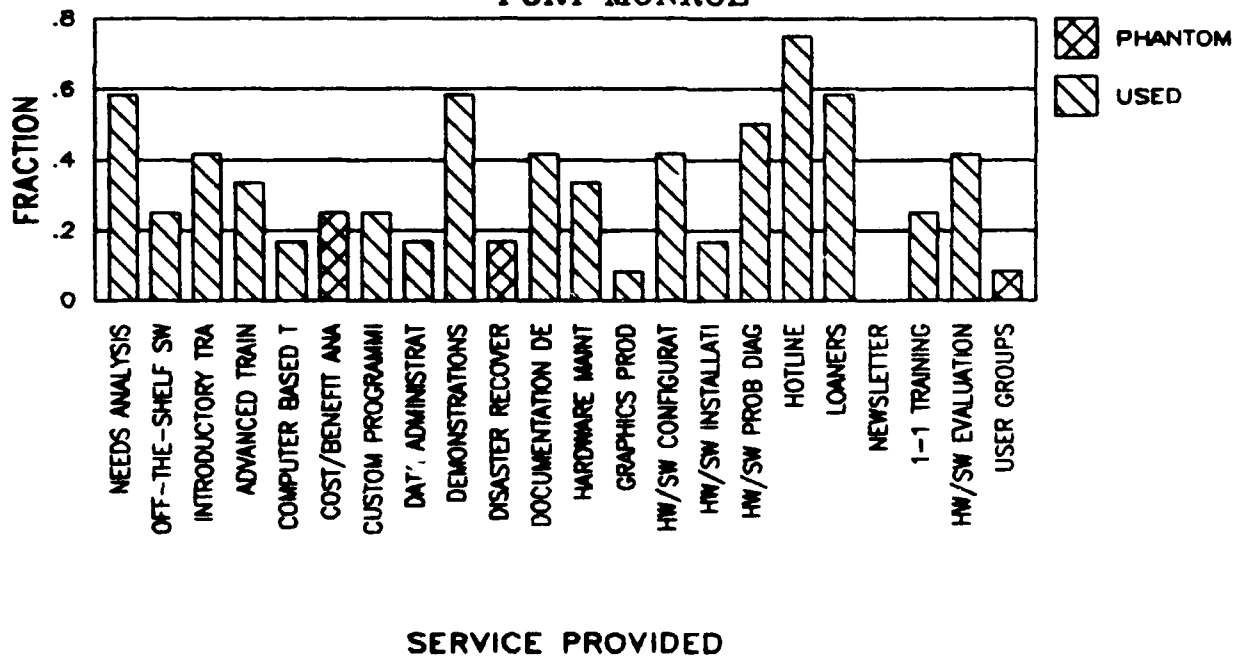


FIGURE D-7 CURRENT REQUIREMENTS
FORT MONROE

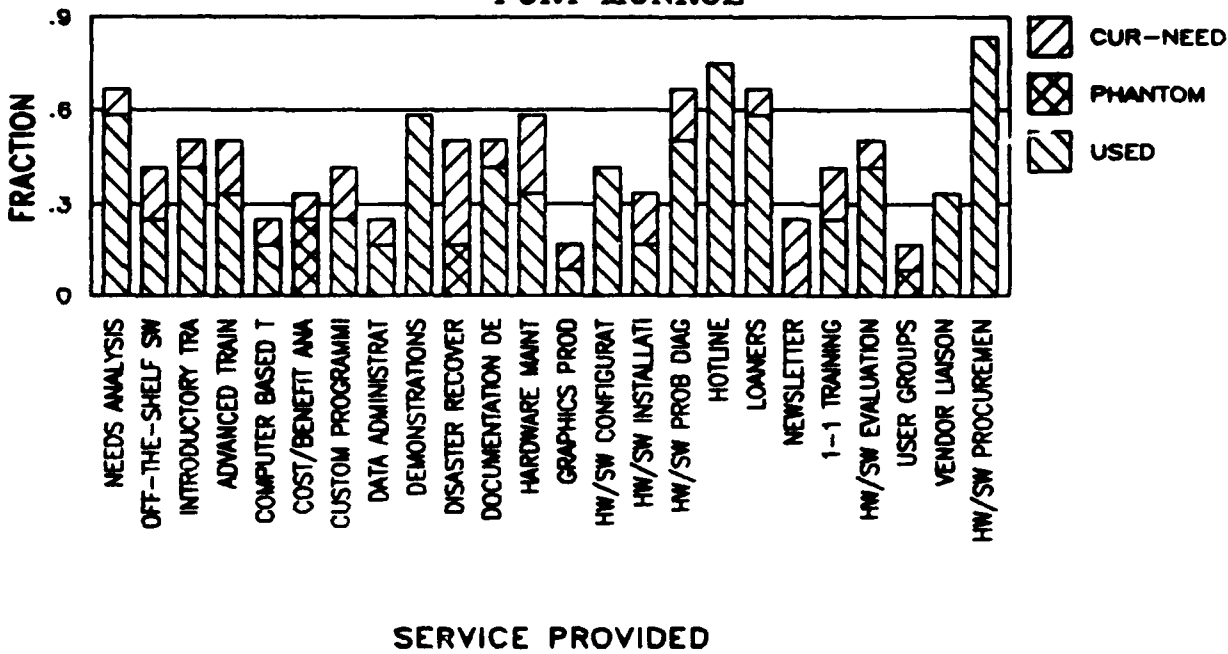
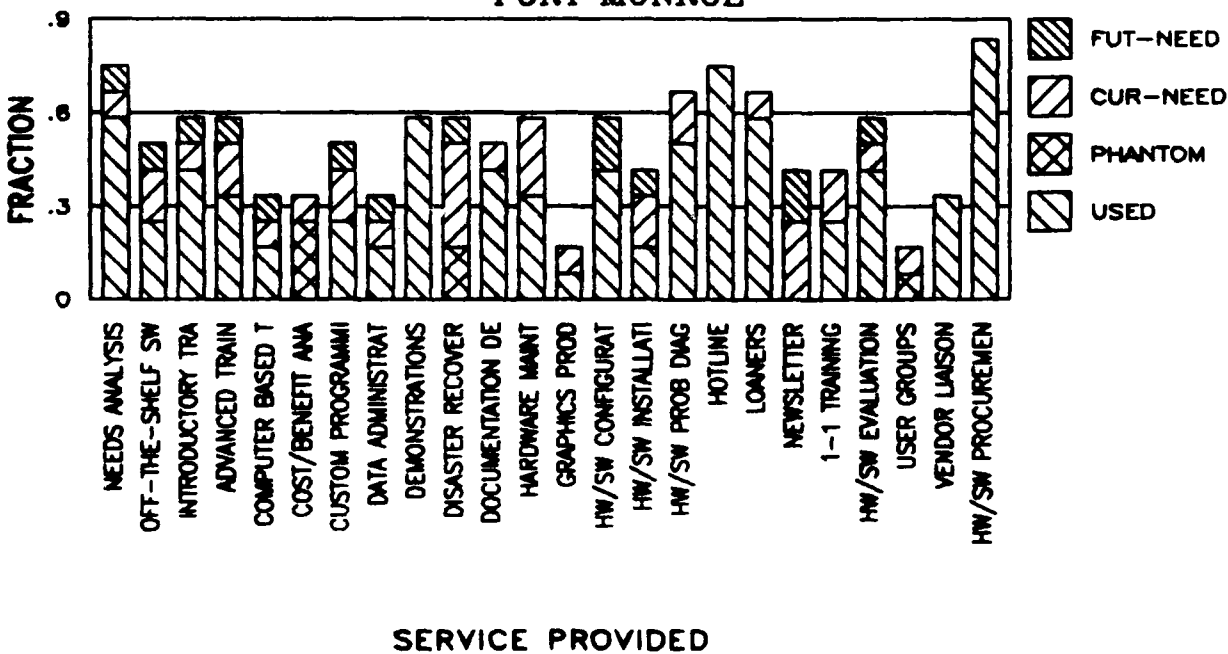


FIGURE D-8 FUTURE REQUIREMENTS
FORT MONROE



HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	8
HARD DISC	33
LARGER HARD DISC	42
MORE CONVENIENT BACKUP	8
BETTER MONITOR	33
MODEM	17
PLOTTER	25
PRINTER	17
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	42
SOFTWARE INTERFACE	58
REPORT GENERATOR	25
STATISTICAL PACKAGES	17
DECISION SUPPORT SYSTEM	42
WINDOWS	33
MICRO NETWORK	42

FIGURE D-9 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	42
2. NEW OFFERINGS	67
3. HARDWARE	50
4. SOFTWARE	50
5. MAIN FRAME	67

FIGURE D-10 KNOWLEDGE

CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
ELECTRONIC MAIL	8		17			25
WORD PROCESSING	33	8	8			37
DATA BASE	50	33	8			92
SPREADSHEET	25	8	25			58
MODELING			33			33
STATISTICS	17	8	8	8		42
TUTORIALS		17	25	8	8	58
DATA COMMUNICATIONS	17	8	17	8	8	58
GRAPHICS	17	17	25		8	67
MAIN FRAME						
ELECTRONIC MAIL	42					42
WORD PROCESSING	42	8				50
DATA BASE	8	8				17
SPREADSHEET	8				8	17
STATISTICS		8		8		17
TUTORIALS		8				8
DATA COMMUNICATIONS	17		8	8		33
GRAPHICS		8				8

FIGURE D-11 GENERIC SOFTWARE USE

ADVICE SCALES			
SOURCE	ACCURACY	UNDERSTANDING	TIMELINESS
IC	2.6	2.6	3.3
USER GROUPS	5.0	5.0	6.1
FRIENDS	6.0	5.8	6.0
CO-WORKER	3.3	2.8	2.6
MANUALS	3.0	3.6	2.9
MAGAZINES	5.6	4.9	4.6
STORES	6.3	6.0	6.2
OTHERS	4.5	4.3	4.6
SUPERVISOR	6.6	6.0	4.3
ASSISTANCE SCALES			
	PROCEDURAL	HW/SW	MICRO USE
CO-WORKER	0.42	0.33	0.08
MANUALS	0.25	0.17	0.17
IC	0.08	0.17	0.83
SUPERVISOR	0.0	0.08	0.00

FIGURE D-12 MICRO COMPUTER ADVICE

APPENDIX E
WHITE SANDS MISSILE RANGE

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APPENDIX E
WHITE SANDS MISSILE RANGE

1.0 BACKGROUND

White Sands Missile Range, New Mexico is the Army's main missile test site and has a population of 1,400 military and 4,000 civilians. Computer users have traditionally been supported at White Sands jointly by the Computer Systems Directorate (CSD) and the data communications shop. 1 July 1986 marked the official beginning of the IC. The IC had been planned since October 1985.

The IC manager is extremely concerned with the impact of the proliferation of "stove pipe" systems in terms of unscheduled utilization of his resources to install and train the users on those systems. One such instance involved the receipt of a so-called "integrated" system wherein the hardware components would work into that system's environment. Four to six man weeks of IC staff manpower was required to develop a workable configuration for the system. Another instance required twenty-four man hours to install and commence initial operation of the new system. Most of these systems appear in the user's work place with little or no advanced notice and thus create scheduling problems when service is requested for them.

1.1 PLANNING FACTORS

The tasks of determining the hardware and software to be supported, and defining the responsibilities were the primary tasks of the IC planning team. The team was made up of personnel from the DP and Personnel departments. The needs of all departments were determined.

1.2 MISSION SELECTION

The missions of (1) improving DP/end user relations; (2) increasing end user productivity; and (3) providing training to end users to enable them the make efficient use of end user computing assets, were given primary considerations when establishing the goals and objectives of the IC, selecting the services to be provided, and establishing schedules and milestones for the implementation of the IC.

1.3 SERVICES PROVIDED

Figure E-1 shows which services are currently being provided (height = 2) and those which will be provided in the near future (height = 1). No bar is shown for those services neither provided nor planned. All figures for this appendix are placed in the rear of the appendix, behind all text.

The services are defined below:

Assist end users in defining their computing needs,

Assist end users in developing application using off-the-shelf software,

Provide introductory training in the use of microcomputers and software (off-the shelf),

Provide advanced training for users in the utilization of their hardware and software,

Provide computer based training and tutorials to end users so that they may maintain their computer competence,

Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,

Provide custom programming assistance for end users developing microcomputer applications using other than off-the-shelf software,

Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

Provide training and assistance to end users in installation of their hardware and software,

Provide training and assistance to end users in diagnosing problems with their hardware and software,

Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users' hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

Coordinate the establishment of User Groups to foster the exchange of information within the user community of events of interest,

Provide liaison between the end users and microcomputer hardware and software vendors,

Assist the end user in the procurement of microcomputer assets.

2.0 ANALYSIS OF IC OPERATIONS

The results of the interviews conducted during the evaluation visits have been analyzed with respect to the topics discussed in Chapter 6 of the Planning and Implementation Guide. The following sections discuss the findings as they relate to Marketing the IC, On-Going Operations of the IC, and Evaluation of Support Provide to the user community.

Section 2.1 discusses the methods utilized to market the IC's services, and provides a primary measure of the effectiveness of these efforts.

On-Going Operations of the IC are discussed in Section 2.2. The discussion included information about the internal operation of the IC, and utilization of the staff. The discussion also covers training methods and records maintained by the IC.

The value of the IC as seen from the users viewpoint is presented in Section 2.3. The section includes; (1) discussion of expressed needs of the users in terms of hardware, software, and training; (2) check list responses; and (3) rating of the IC as a source of assistance and information about microcomputer usage.

2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation of a User's Manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

The publishing of a newsletter and development of a User's Manual is being planned for the next year. User groups have been used successfully at White Sands Missile Range for more than twenty (20) years. Four (4) different groups currently meet: (1) Work Place Automation (WAS); (2) microcomputer; (3) Intel; and (4) scientific and engineering users. User groups meetings are scheduled monthly during duty hours. The first half of the hour-long meetings are devoted to a formal presentation by a subject matter expert. The last half of the meeting takes the form of a round-table, where users share problems, solutions, and lessons learned.

User Group meetings and other special events are advertised in the weekly installation newspaper, and on bulletin boards.

White Sands conducts an annual survey of all elements on post to solicit information on applications in use, including software developed by users. The survey results in a published catalog which lists for each application, the application area, how the software is used, the organization, and a point of contact. The IC also maintains an automated library of public domain software available to users without cost.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure E-2 shows the fraction of the users that are aware of the true status of each of the services. The user is generally well informed of those services which may be considered as basic functions of a beginning IC, but the awareness drops off when considering the more advanced types of services such as data administration. The user's lack of awareness of the status of demonstrations probably stems from the fact that the service is planned for implementation and some initial trial demonstrations may have

taken place. In the case of hardware/software evaluations, three of the users were unaware that the service was being provided.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategies and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) Manual should be developed to document these requirements and provide ready reference for the staff.

Operating standards, guides and procedures for the IC and a User's Manual are being prepared, but promulgation is being deferred until the reorganization and consolidation of ISC assets has been completed (see next paragraph).

The stated objective of the IC is to "provide integrated customer support to the user's multidisciplined operational activities, to include providing of technical training to user personnel, hardware and software displays and demonstrations, a software clearing house, and technical user consultant services".

The primary goal is to develop into a totally integrated facility responsive to the user community needs. No strategies or milestones were given for achieving these goals.

2.2.1 IC Organization

The IC, at the time of the evaluation visit, was staffed by one full time and eight part-time people. The transfer of other assets from the Computer Directorate to the local ISC Commander had not occurred. The staffing of the IC is planned to change considerably when the consolidation of assets occurs. In the meantime, additional end user support is obtained from both the Business Systems, and Scientific and Engineering Systems branches through informal arrangements between the respective managers. The IC remains the central Point of Contact (POC) for end users, and problems within the scope of responsibility of others are referred to the POC of the appropriate branch. When formed, the IC will have more than one subdivision, with staff specialists in microcomputer hardware/software products, training, installation and maintenance, networking and data communications, and micro/main frame links.

2.2.2 IC_Support_Policies

The IC supports terminals linked to the mainframe, stand alone micros and minis, micro networks, and micros connected to the mainframe. It attempts to support all of the popular brands of micro software, and will provide full support to applications development using off-the-shelf software. Support for other applications development is limited to assistance and advice, not custom programming. The IC has no policy for assisting users to get access to data in mainframe data files.

Training is sponsored by the Scientific Systems Division of the CSD. An annual training needs survey is conducted, and training for the entire year is scheduled based on the survey. A copy of the needs survey, and a course evaluation form are found in Appendix F of the Planning and Implementation Guide. Actual classroom training is conducted by contract personnel, but the course curricula is set by the staff.

The IC also provides some support to outside activities, primarily in telecommunications and data transmission, such as Dugway, Anniston, Fort Bliss, Pine Bluff and Halloran AFB.

2.2.3 Staff_Awareness

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in Figure E-3. The value of the "aware" variable is computed as the fraction of the staff members' responses that meet the awareness definition of awareness as defined in paragraph 2.1.2. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a breakdown in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementation stage. There is a workable agreement for all services except demonstrations and hardware maintenance. These differences are probably due to uncertainty as to the degree of implementation that has been accomplished, since the services are reported as being planned by the manager and as operational by most of the staff members.

2.2.4 IC_Staff_Utilization

The utilization of personnel in the IC is shown Figure E-4. In Figure E-4, the IC manager's estimate of the percent of total time spent by his staff is compared to the normalized total percent of time calculated from the individual staff members estimates of their utilization, and is an estimate of the IC manager's feel for what tasks are taking up his staff's time. An indication of the assignment of special interest of a particular

staff member is given by the percent of time that is spent on the different tasks.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

Figure E-5 depicts the fraction of users actually utilizing the IC's services. A phantom use is said to occur when a user reports having obtained the service and the IC manager reports that no such services was provided.

Current support requirements are reflected in Figure E-6. The variable (cur-need) added to this plot depicts the case wherein the user reports a belief that the service is not provided and the IC manager reports the service as being provided, and the user reports that the service would be utilized if it were available. The addition of the cur-need inputs creates some demand for each of the services proposed. Those with a fraction greater than .5 should be given particular emphasis in the current operations of the IC.

The information contained in Figure E-7 tends to show the direction the IC should be going if it is to meet the future demands for services. In this figure, an additional variable, fut-need, is added. A future need is defined as the case where the user indicates no need for the service at the present time, but can foresee the need within the next year.

2.3.2 Other User Requirements

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in Figure E-8. The major complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired

should be capable of easily developing report formats and extracting data from several different files with different characteristics.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure E-9 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. Interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available then a need for training in use of that software is needed.

2.3.3 Generic Software Used

Figure E-10 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are word processing and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas.

2.3.4 Training

Four of five of the users interviewed had received some sort of training in microcomputer use from the IC, and rated the course as having a moderate to positive impact upon their ability to use their systems. The two who reported a moderate impact had one to three years of previous experience in using microcomputers. Nearly all users expressed a strong desire for training. The novice for introductory level so he can get started, and the more experienced user wants to learn advanced techniques to get the most out of his equipment.

2.3.5 Productivity Increases

Four of the five users interviewed reported significant productivity improvements through use of computers in their workplace. The improvements were stated in terms of reduction in the time required to complete a task, or in terms of tasks that could now be accomplished which could not have previously been done. Time reductions ranged from 1.5:1 to 10:1. These benefits were related primarily to spreadsheet and word processing applications.

2.3.6 IC Advise Scales

Figure B-11 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The IC, co-workers, and manuals all ran significantly higher than the other sources. This result tends to show that a user is more prone to seek immediate assistance from a knowledgeable co-worker first, then going to the IC or the manual if the co-worker is not available or doesn't know the answer. This suggests that one way to reduce some of the "nuisance" type trouble calls would be to cultivate a knowledgeable user in each department, concentrate on the training on this person, and expecting this person to become the advisor for that department for routine assistance (i.e. minor problems not involving an inordinate amount of the expert's time).

2.3.7 Control Issues

Staff responses to the check lists on the issues of continuity of operation, audits and controls, cost-benefit analysis, system development and documentation standards, and data security matters show that these aspects of end user computing are emphasized by the staff at all times. The user responses, however, indicate that these issues are truly not recognized as a real problem and are given no more than lip service.

FIGURE E-1 SERVICES PROVIDED

WHITE SANDS MISSILE RANGE

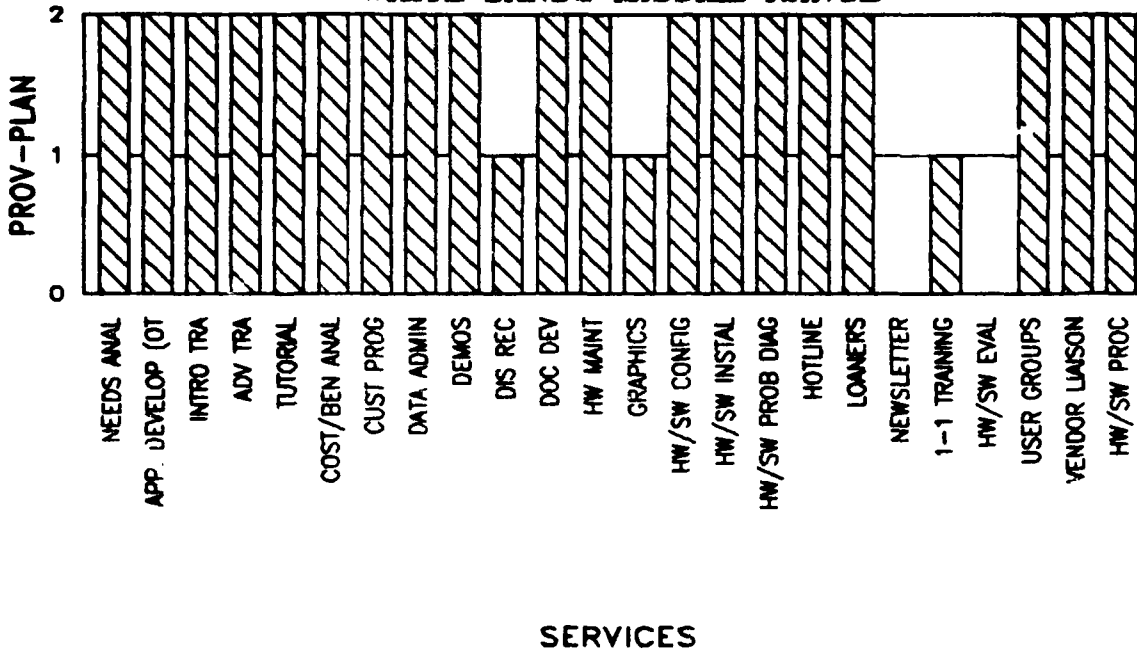
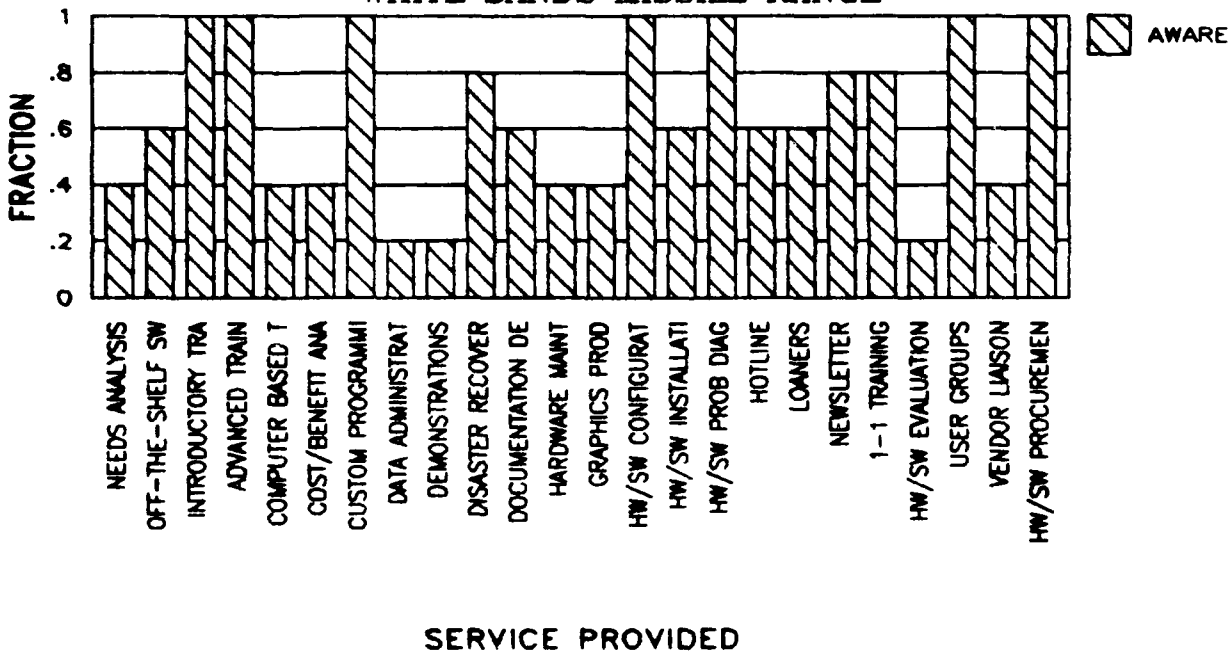
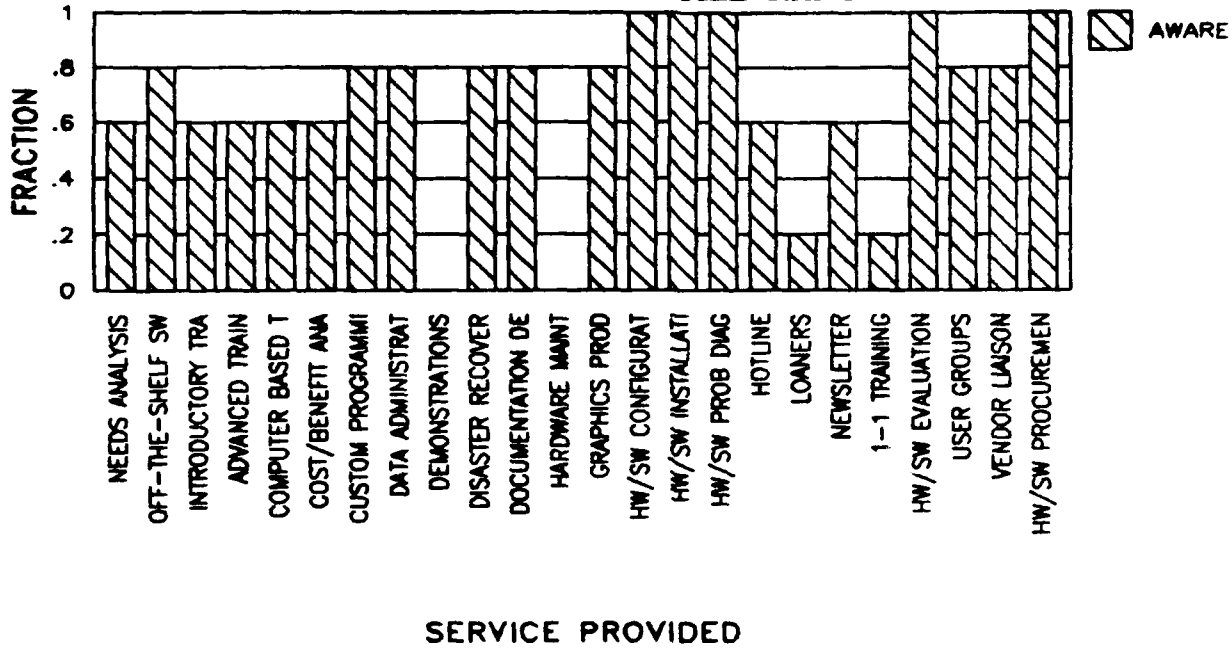


FIGURE E-2 USER AWARENESS

WHITE SANDS MISSILE RANGE



**FIGURE E-3 STAFF AWARENESS
WHITE SANDS MISSILE RANGE**



STAFF TASK	STAFF						
	IC MGR EST.	AVG EST.	STAFF 1 EST.	STAFF 2 EST.	STAFF 3 EST.	STAFF 4 EST.	STAFF EST.
USER TRAINING	12.5	8.6	11.0	4.5	22.2	5.0	.0
HW/SW ACQUIS'N	12.5	17.9	3.7	6.1	.0	20.0	60.0
HW/SW EVALS	18.8	7.9	14.7	7.6	2.2	10.0	5.0
SW LIBRARY	6.3	5.2	3.7	9.1	3.3	5.0	5.0
USER GROUPS	6.3	12.3	22.1	1.5	27.8	5.0	5.0
CONSULTING	12.5	10.1	11.0	12.1	22.2	5.0	.0
DEMONSTRATIONS	6.3	2.4	.7	3.0	3.3	5.0	.0
MAINTENANCE	.0	3.1	.0	10.6	.0	5.0	.0
LIAISON WITH DP	12.5	5.2	3.7	15.2	2.2	5.0	.0
HW/SW INSTALL	12.5	16.5	7.4	13.6	16.7	20.0	25.0
PROB SOLUTION	0.0	7.7	22.1	16.7	.0	.0	.0

FIGURE E-4 STAFF TIME DISTRIBUTION

FIGURE E-5 SERVICE UTILIZATION
WHITE SANDS MISSILE RANGE

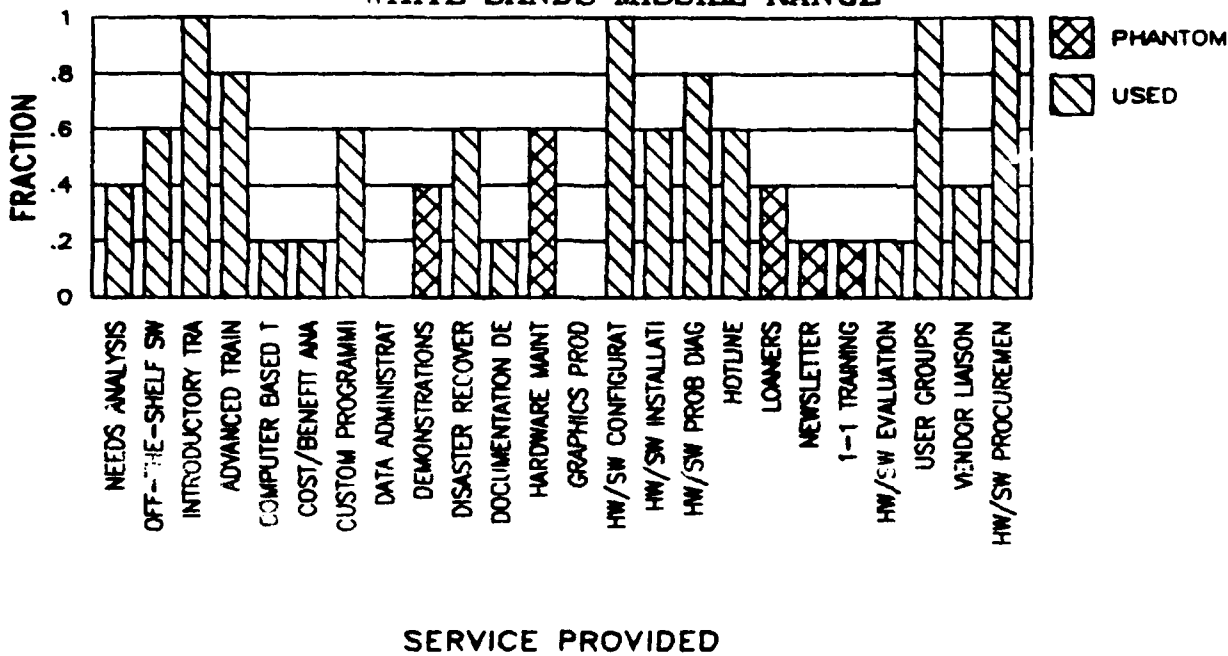
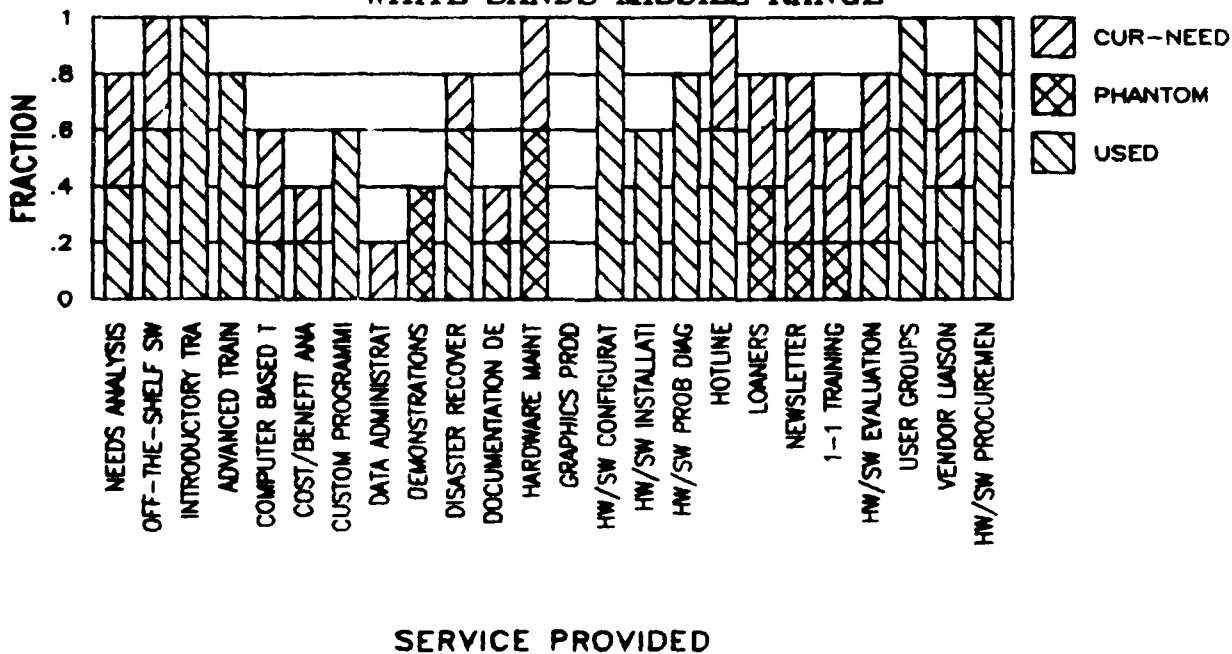
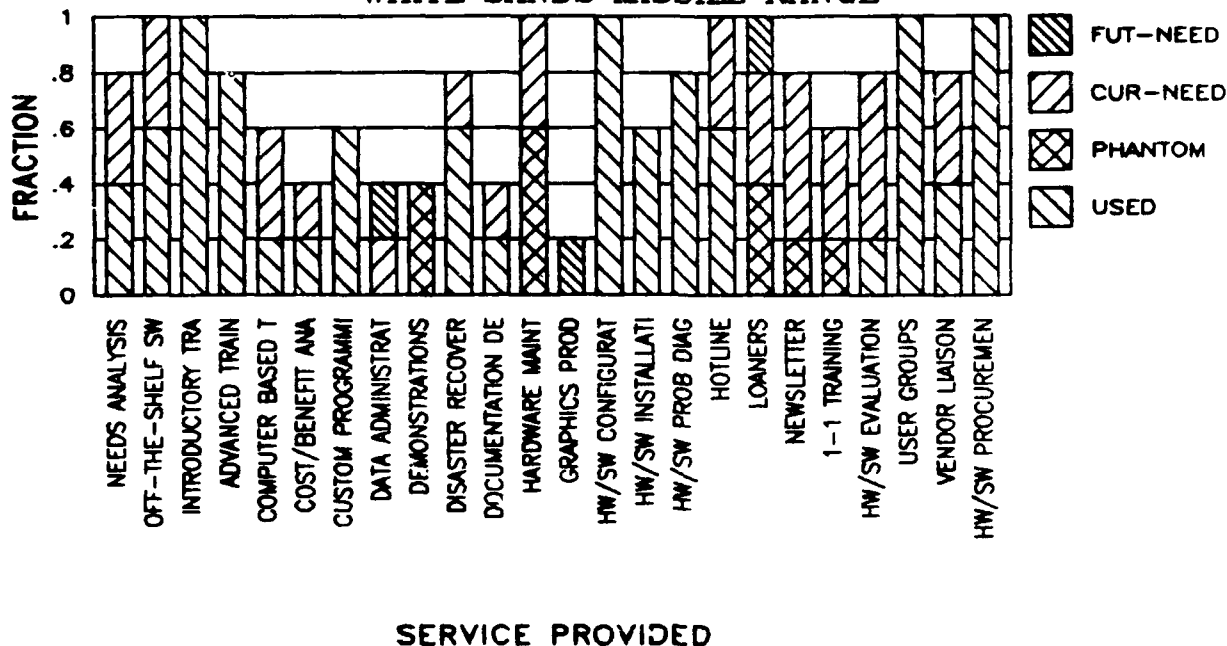


FIGURE E-6 CURRENT REQUIREMENTS
WHITE SANDS MISSILE RANGE



**FIGURE E-7 FUTURE NEEDS
WHITE SANDS MISSILE RANGE**



HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	60
HARD DISC	20
LARGER HARD DISC	20
MORE CONVENIENT BACKUP	60
BETTER MONITOR	0
MODEM	40
PLOTTER	20
PRINTER	60
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	60
SOFTWARE INTERFACE	20
REPORT GENERATOR	20
STATISTICAL PACKAGES	40
DECISION SUPPORT SYSTEM	40
WINDOWS	60
MICRO NETWORK	40

FIGURE E-8 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	60
2. NEW OFFERINGS	40
3. HARDWARE	20
4. SOFTWARE	80
5. MAIN FRAME	40

FIGURE E-9 KNOWLEDGE

CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
ELECTRONIC MAIL	40	0	0	0	0	40
WORD PROCESSING	80	0	0	0	0	80
DATA BASE	20	0	0	20	0	40
SPREADSHEET	0	40	20	0	0	60
MODELING	0	0	0	0	0	0
STATISTICS	0	20	0	0	0	20
TUTORIALS	0	0	0	0	0	0
DATA COMMUNICATIONS	20	0	0	0	0	20
GRAPHICS	0	40	0	0	0	40
CATEGORY	MAIN FRAME					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
ELECTRONIC MAIL	20	0	20	0	0	40
WORD PROCESSING	20	0	0	0	0	20
DATA BASE	20	0	0	0	0	20
SPREADSHEET	0	0	0	0	0	20
MODELING	0	0	0	0	0	0
STATISTICS	0	0	0	0	0	0
TUTORIALS	0	0	0	0	0	0
DATA COMMUNICATION	20	0	0	0	0	20
GRAPHICS	0	0	0	0	0	0

FIGURE E-10 GENERIC SOFTWARE USED

ADVISE SCALES			
SOURCE	ACCURACY	UNDERSTANDING	TIMELINESS
IC	1.25	1.75	1.75
USER GROUPS	1.5	2.25	3.75
FRIENDS	7.0	6.0	6.0
CO-WORKER	3.5	2.5	2.25
MANUALS	2.5	4.5	2.5
MAGAZINES	6.0	8.0	7.0
STORES	8.0	8.0	8.0
OTHERS	3.5	4.5	2.5
SUPERVISOR	9.0	9.0	9.0

ASSISTANCE SCALES			
	PROCEDURAL	HW/SW	MICRO USE
IC	0.50	0.77	1.00
MANUALS	0.25	0.25	0.33
VENDOR	0.25	0.00	0.00

FIGURE E-11 MICRO COMPUTER ADVISE

APPENDIX F
FORT HOOD

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APPENDIX F FORT HOOD

1.0 BACKGROUND

Fort Hood, Texas is the headquarters of III Corps, 2nd Armored Division, 1st Cavalry Division, 6th Cavalry Brigade, 3rd Signal Brigade, and Combined Arms Test Activity and has a population of 38,000 military and 5,600 civilians. The IC at Fort Hood has been in existence since 1984; planning for the center was begun during 1983-4. A summary of those services currently offered by the IC, and those planned, is shown in Figure F-1. All figures for this appendix are placed in the rear of the appendix, behind all text. In addition to the current centrally located IC, two additional ICs are planned at each end of the post.

The four (4) of the six (6) tactical units at Fort Hood have established their own ICs, which focus heavily on training. Users begin with the vendor supplied tutorials that come with the software packages. Then they progress to paper tutorials, developed by the IC, with exercises based on work requirements. When the user has completed this tutorial, he develops an application, with the help of the IC, specific to his job situation. This training sequence may take place over a period of several months, with the user spending approximately four (4) hours a week in the IC. An Information Management Council is planned, which would bring together on a regular basis the tactical unit information managers with the DOIM and staff. Some of the tactical ICs are publishing newsletters and have formed users groups.

1.1 PLANNING FACTORS

The primary tasks carried out by the study team when planning for the IC were surveying user needs, determining the hardware and software to be supported, defining the responsibilities of the IC, and surveying available training resources. All departments participated in the study process.

1.2 MISSION SELECTION

Primary consideration was given to the following missions when planning for the IC; (1) improve DP/end user relations, (2) reduce DP backlog, (3) increase end user productivity, (4) standardize microcomputer hardware and software, (5) provide training in computer usage, assist end users in identifying needs, (6) evaluate new technology, and (7) provide authorized users access to previously information/data bases.

1.3 SERVICES PROVIDED

Figure F-1 contains a list of services which may be offered by any IC. Those which are being provided are shown with a height of two, while those

still in the planning and implementation stage only have a height of one. No bar is shown for those services neither provided nor planned. The services are defined below:

Assist end users in defining their computing needs,

Assist end users in developing application using off-the-shelf software,

Provide introductory training in the use of microcomputers and software (off-the shelf),

Provide advanced training for users in the utilization of their hardware and software,

Provide computer based training and tutorials to end users so that they may maintain their computer competence,

Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,

Provide custom programming assistance for end users developing micro computer applications using other than off-the-shelf software,

Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

Provide training and assistance to end users in installation of their hardware and software,

Provide training and assistance to end users in diagnosing problems with their hardware and software,

Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users'

hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

Coordinate the establishment of User Groups to foster the exchange of information within the user community of events of interest,

Provide liaison between the end users and microcomputer hardware and software vendors,

Assist the end user in the procurement of microcomputer assets.

2.0 ANALYSIS OF IC OPERATIONS

The results of the interviews conducted during the evaluation visits have been analyzed with respect to the topics discussed in Chapter 6 of the Planning and Implementation Guide. The following sections discuss the findings as they relate to Marketing the IC, On-Going Operations of the IC, and Evaluation of Support Provided to the user community.

Section 2.1 discusses the methods utilized to market the IC's services, and provides a primary measure of the effectiveness of these efforts.

On-Going Operations of the IC are discussed in Section 2.2. The discussion included information about the internal operation of the IC, and utilization of the staff. The discussion also covers training methods and records maintained by the IC.

The value of the IC as seen from the users viewpoint is presented in Section 2.3. The section includes; (1) discussion of expressed needs of the users in terms of hardware, software, and training; (2) check list responses; and (3) rating of the IC as a source of assistance and information about microcomputer usage.

2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation of a User's Manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

The first issue of the IC newsletter was published in March of this year. It included articles about points of contact, repair and maintenance procedures, requests for services, microcomputer software. An ADP Information Guide has also been published. The table of contents of this guide is contained in Appendix F of the Planning and Information Guide. The IC also has a PC based briefing on the purpose and functions of the IC.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year.

The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure F-2 shows the fraction of the users that are aware of the true status of each of the services. The overall percentage of users that are aware of the services being provided by the IC is unusually low. One possible explanation is the short length of time that the newsletter has been in existence. The inclusion of more articles relating to the IC's services in future issues will help. The fact that the user sample interviewed was predominantly main frame oriented may also have some impact. It is also believed that the ADP Information Guide section relating to obtaining services, other than those main frame related services, of the IC could be greatly expanded.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user

computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategies and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) manual should be developed to document these requirements and provide ready reference for the staff.

2.2.1 IC Organization

The IC is staffed by twelve people including the manager. Most of the staff came from DP (eight); operational (one); and outside hired (three). Each staff member is a specialist and has prime responsibility for a subset of services/products to be supported. One staff member has an educational background. He has developed a set of courses and teaches the classes offered.

The defined primary missions of the IC is to provide the user community with the productivity aids. Allowing users to become self-sufficient in the access of data, reducing his/her requirements for programming resources from the Information Systems Department.

The objective of the IC is to; (1) provide cradle to grave service to, assist the user in defining his needs, structure a system to satisfy his needs, assist in the procurement of hardware and software, provide training on a system he will receive, install hardware and software for the user, provide consulting service as his needs expand; (2) provide training on hardware and software, (3) advertise availability of services, (4) stay ahead of user needs in order to be proactive rather than reactive.

Goals include: (1) increase training for the users as evidenced by an increased number of students completing courses, (2) review applicable software and recommend procurement of that which best fits the users needs, (3) establish a user group, (4) establish an electronic bulletin board, (5) enhance the status of the IC, (6) fully staff the IC.

2.2.2 IC Support Policies

The IC supports timesharing, online mainframe terminals, stand alone microcomputers, networked microcomputers, and networks.

The IC performs a full range of data administration like duties while assisting the authorized users get access to previously inaccessible information and data bases. Data security principles are imposed in cases where the user is accessing critical data. The IC provides a full range of assistance for the user who wished to develop an application using a standard off-the-shelf software package, but will not support custom programming efforts.

The sequence for procurement of ADP resources is as follows: (1) user identified need; (2) IC analyst helps user identify requirements; (3) user completes capabilities requirements form (a copy is located in Appendix F);

(4) requirement goes to the plans and management office for approval; (5) requirement goes to automation division chief who transfers it to a program analyst when it is mainframe related, or to the IC when it is PC related; (6) the IC configures the system; (7) the configuration, a project design plan, and a dollar estimate go to the user for review; (8) item ordered; (9) user receives training; and (10) IC provides installation assistance

The Center estimates that 90% of the users purchase the installation standard hardware and software products. The IC does not promise to provide in-depth support of products not on the standard list.

Training is offered by the IC and led by IC staff. Users are required to participate in training before they are issued a PC. The IC offers training on the installation's standard software packages, and provides training geared to managers as well. The Civilian Personnel Office (CPO) conducts a semi-annual training requirements survey, and schedules students for training. Both civilian and military personnel are eligible for training. A local college has agreed to accept courses offered by the IC for credit. The responsibilities of the DOIM IC, CPO, and DAMO are described in a formal Memorandum of Understanding. A copy of this document is in Appendix F of the Planning and Implementation Guide.

2.2.3 Staff Awareness

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in Figure F-3. The value of the "aware" variable is computed as the fraction of the staff members' responses that meet the awareness definition of awareness as defined in paragraph 2.1.2. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a break-down in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementation stage. There is a good agreement for all basic services except for the more advanced services such as data administration, loan equipment and formation of user groups. Much of the discrepancy stems from an uncertainty as to the state of implementation of some of the services. Care must be exercised that staff members do not become so engrossed in the happenings within their specialty area that they lose sight of what is happening in the IC as a whole.

2.2.4 IC Staff Utilization

The utilization of personnel in the IC is shown Figure F-4. It shows the IC manager's estimate of the percent of his time is spent in each of the task areas. In Figure F-5, the IC manager's estimate of the percent of total time spent by his staff is compared to the normalized total percent

of time calculated from the individual staff members estimates of their utilization, and is an estimate of the IC manager's feel for what tasks are taking up his staff's time. An indication of the assignment of special interest of a particular staff member is given by the percent of time that is spent on the different tasks.

Figure F-5 provides an estimate of the degree to which the IC manager is kept aware of which tasks occupy the most of their staff's time. The spread in the percent of time spent on different tasks by different staff members is believed to stem from the different functional responsibilities assigned to those staff members.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

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Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired should be capable of easily developing report formats and extracting data from several different files with different characteristics.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure F-10 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. The interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using that software is needed.

2.3.3 Generic Software Used

Figure F-11 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are data base and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas.

2.3.4 Training

Four of the eleven users interviewed have attended a course given by the IC. All were enthusiastic and believed that the course had a definite positive impact on their ability to use the computing equipment. Others complained about not getting into courses, waiting list too long. Nearly all users expressed a strong desire for training. The novice for introductory level so he can get started, and the more experienced user wants to learn advanced techniques to get the most out of his equipment.

2.3.5 User Productivity

Most users interviewed reported significant productivity improvements through use of computers in their workplace. The improvements were stated in terms of reduction in the time required to complete a task, or in terms of tasks that could now be accomplished which could not have previously been done. Time reductions ranged from 2:1 to 10:1. These benefits were related primarily to data base and word processing applications.

2.3.6 IC Advice Scales

Figure F-12 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The IC, co-workers, and manuals all ranked significantly better than the other sources. This result tends to show that a user is more prone to seek immediate assistance from a knowledgeable co-worker first, then going to the IC or the manual if the co-worker is not available or doesn't know the answer. This suggests that one way to reduce some of the "nuisance" type trouble calls would be to cultivate a knowledgeable user in each department, concentrate on the training on this person, and expecting this person to become the advisor for that department for routine assistance (i.e. minor problems not involving an inordinate amount of the expert's time).

2.3.7 Control Issues

Staff responses to the check lists on the issues of continuity of operation, audits and controls, cost-benefit analysis, system development and documentation standards, and data security matters show that these aspects of end user computing are emphasized by the staff at all times. The user responses, generally indicate that these issues are truly not recognized as a real problem and are given no more than lip service. Nearly one fourth of the users at Fort Hood (much more than at any other site) show genuine concern for these issues. It is believed that the response from the Fort Hood users is this high because of the greater percentage of main frame users interviewed.

FIGURE F-1 SERVICES PROVIDED

FORT HOOD

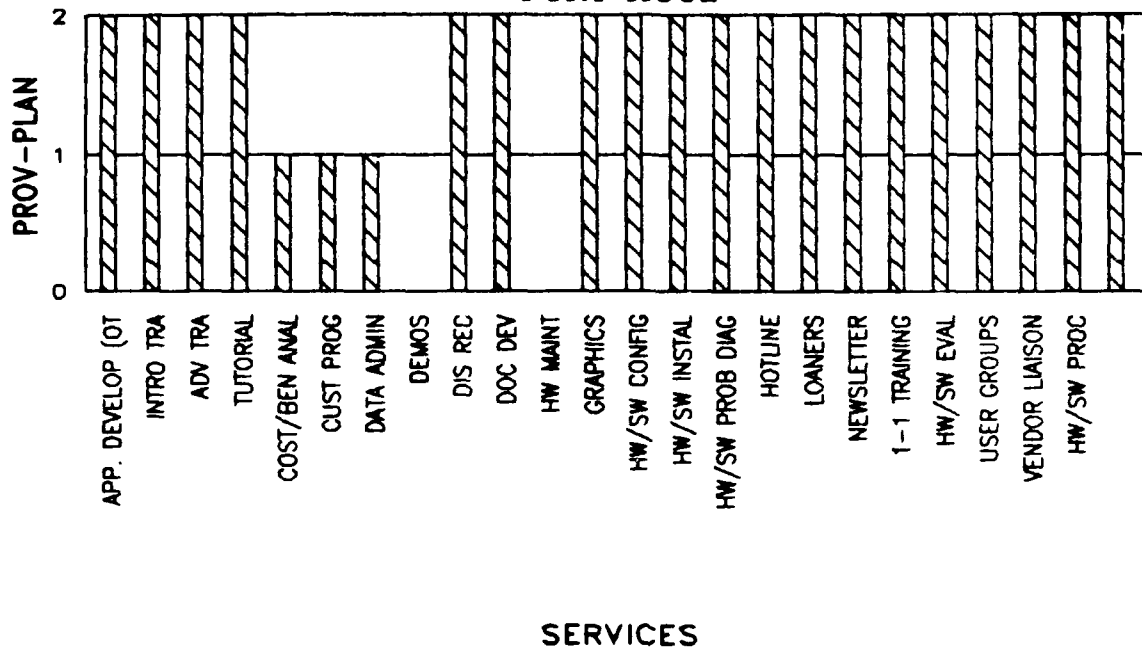
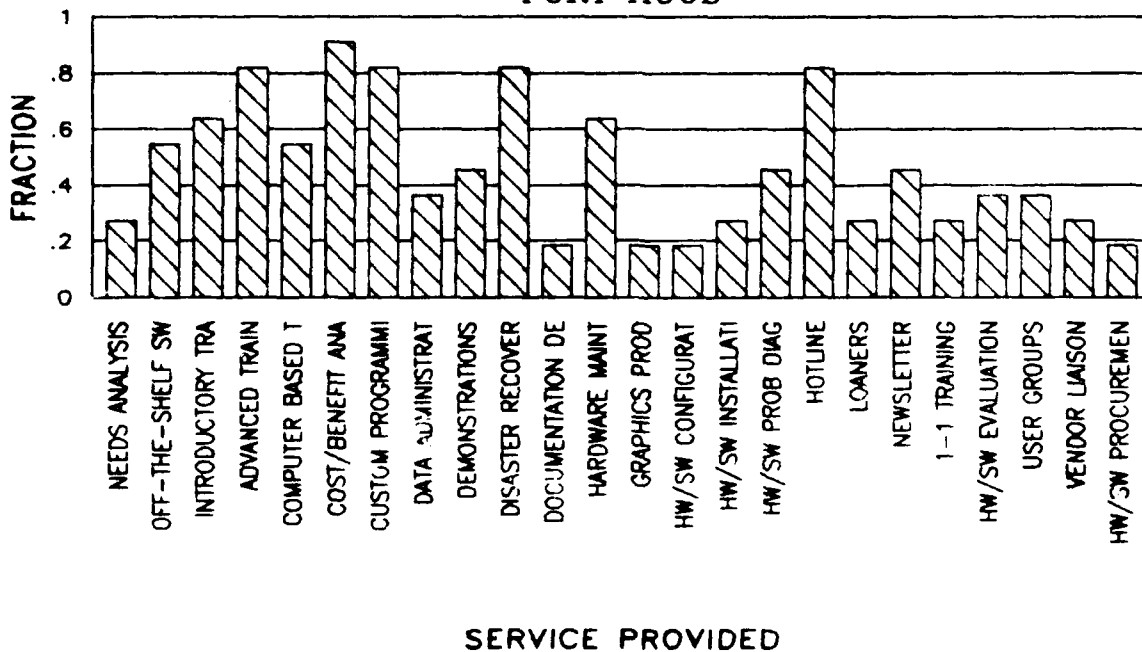
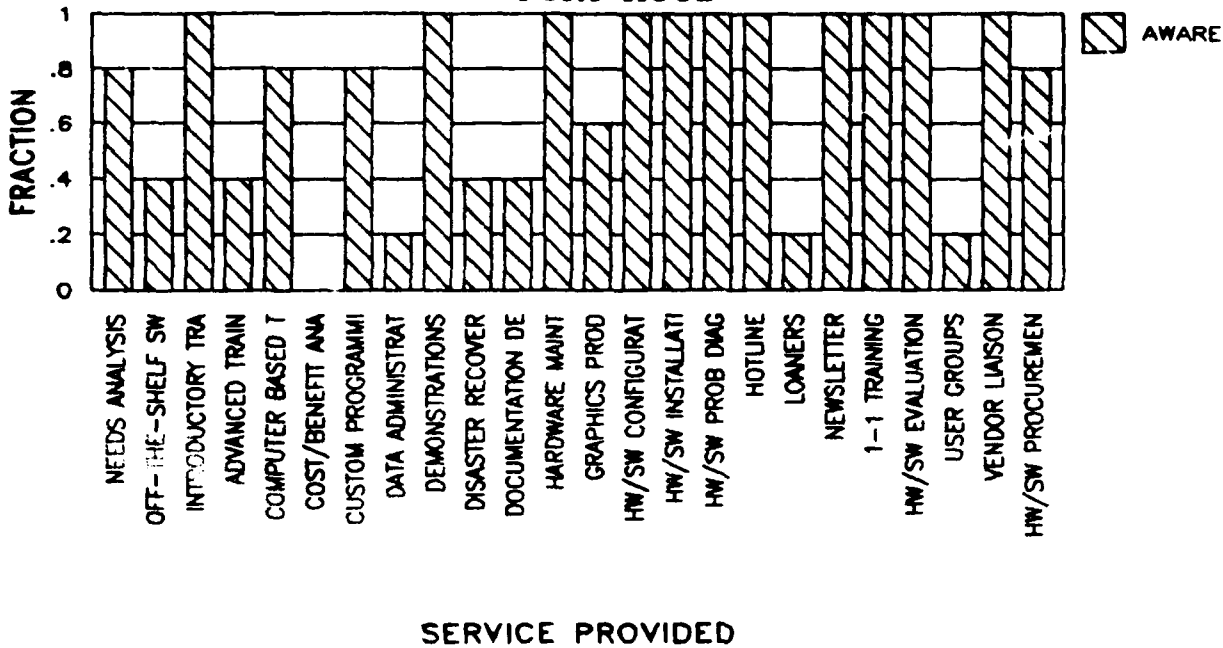


FIGURE F-2 USER AWARENESS

FORT HOOD



**FIGURE F-3 STAFF AWARENESS
FORT HOOD**



IC MANAGER	
TASK	PERCENT
STAFF TRAINING	5
USER TRAINING	5
DEMONSTRATIONS	5
LIAISON WITH DP	5
LIAISON WITH USERS	5
BUDGET PREPARATION	5
HW/SW REQUISITIONS	15
PLANNING	15
SCHEDULING	30
ADMINISTRATION	10

FIGURE F-4 IC MANAGER TIME DISTRIBUTION

STAFF							
STAFF TASK	IC MGR EST.	AVG EST.	STAFF 1 EST.	STAFF 2 EST.	STAFF 3 EST.	STAFF 4 EST.	STAFF 5 EST.
USR TRA	25.0	28.0	15.4	4.8	.0	20.0	100.0
HW/SW ACQ	3.0	8.0	.0	.0	20.0	20.0	.0
HW/SW EVAL	10.0	15.6	.0	38.1	20.0	20.0	.0
SW LIB	5.0	.8	3.8	.0	.0	.0	.0
UG'S	5.0	5.0	.0	.0	5.0	20.0	.0
CONSULTING	15.0	14.2	46.2	.0	5.0	20.0	.0
DEMOS	2.0	2.0	.0	4.8	5.0	.0	.0
HW MAINT	15.0	6.6	23.1	4.8	5.0	.0	.0
LIAISON DP	10.0	15.2	7.7	38.1	30.0	.0	.0
HW/SW INSTALL	10.0	4.7	3.8	9.5	10.0	.0	.0
PROB SOLV	.0	1.0					1.0

FIGURE F-5 STAFF TIME DISTRIBUTION

FIGURE F-6 SERVICE UTILIZATION
FORT HOOD

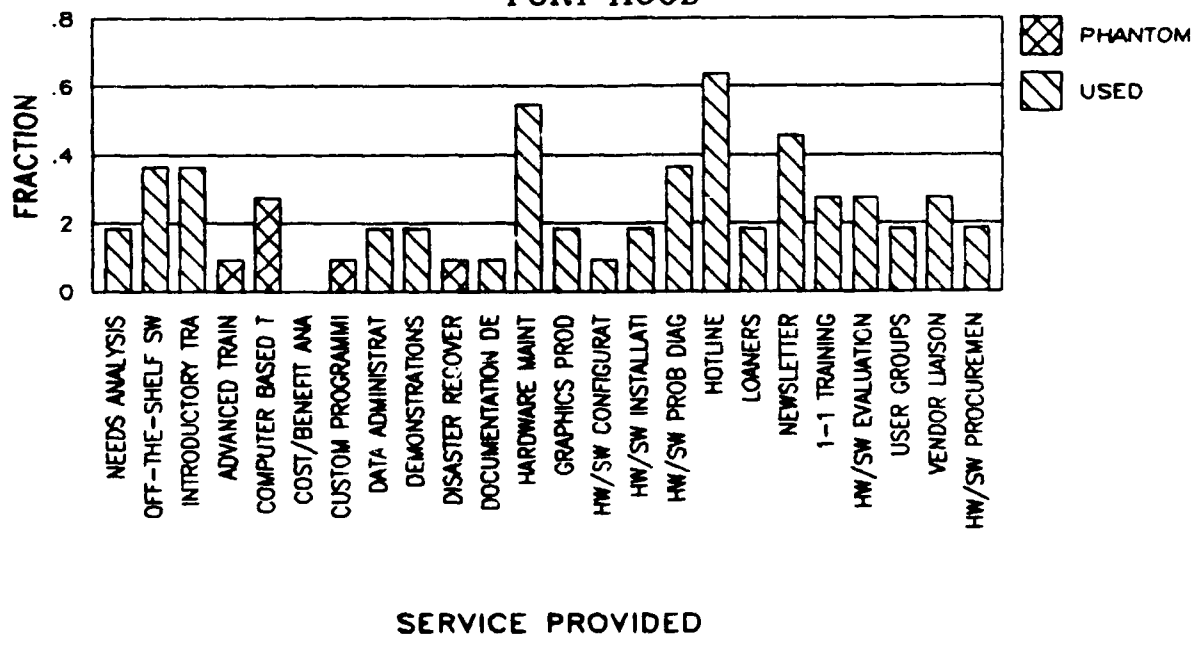


FIGURE F-7 CURRENT REQUIREMENTS
FORT HOOD

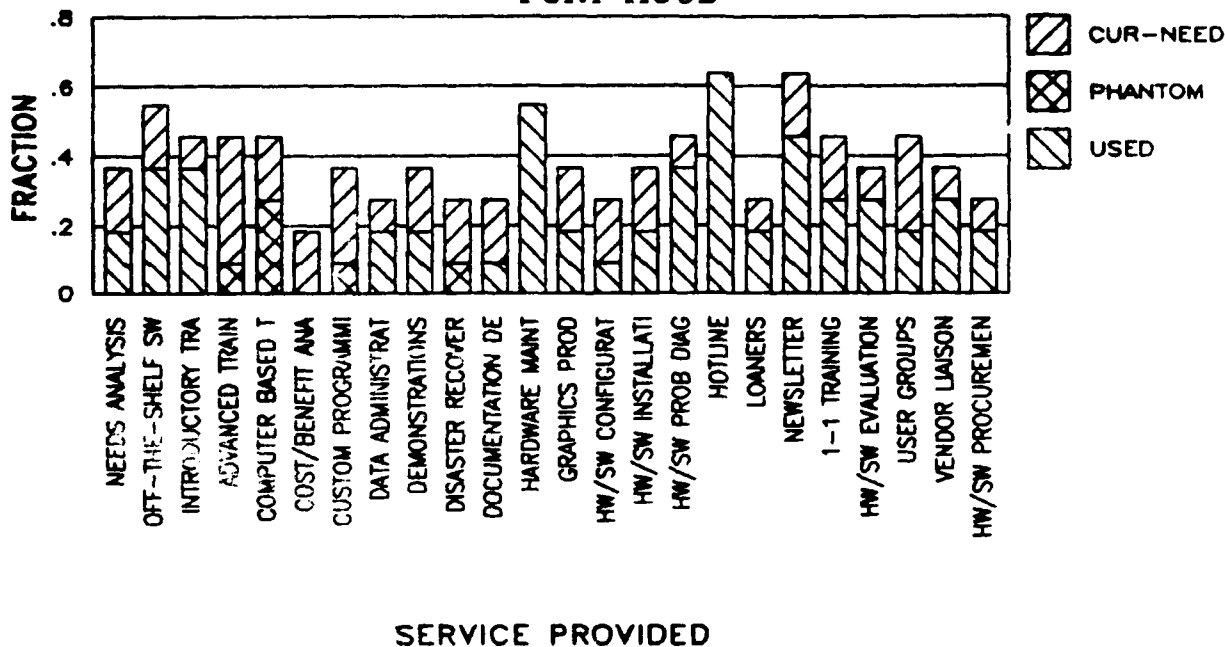
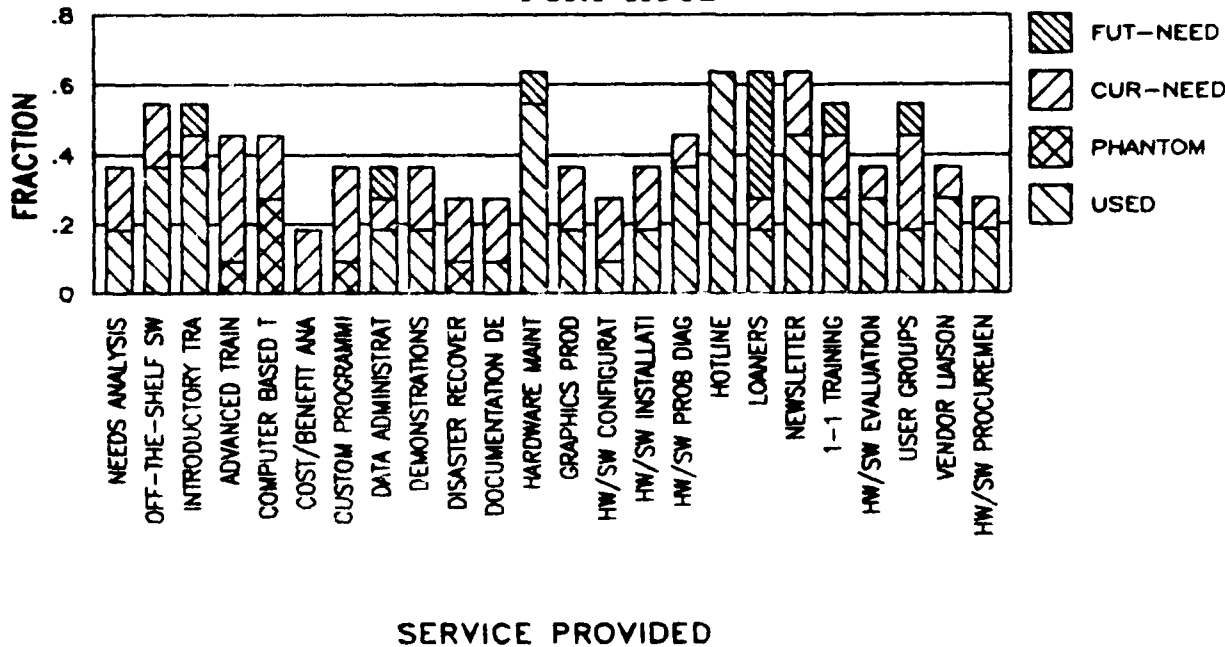


FIGURE F-8 FUTURE REQUIREMENTS
FORT HOOD



HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	27
HARD DISC	18
LARGER HARD DISC	0
MORE CONVENIENT BACKUP	9
BETTER MONITOR	18
MODEM	18
PLOTTER	18
PRINTER	36
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	9
SOFTWARE INTERFACE	18
REPORT GENERATOR	9
STATISTICAL PACKAGES	18
DECISION SUPPORT SYSTEM	18
WINDOWS	18
MICRO NETWORK	27

FIGURE F-9 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	72
2. NEW OFFERINGS	63
3. HARDWARE	45
4. SOFTWARE	72
5. MAIN FRAME	63

FIGURE F-10 KNOWLEDGE

: CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
: ELECTRONIC MAIL	0	0	0	0	0	0
: WORD PROCESSING	9	9	18	0	9	45
: DATA BASE	27	0	9	0	9	45
: SPREADSHEET	27	0	18	9	0	54
: MODELING	0	0	18	0	0	18
: STATISTICS	18	0	0	18	0	36
: TUTORIALS	9	0	9	0	18	36
: DATA COMMUNICATIONS	18	0	0	18	0	36
: GRAPHICS	0	0	9	27	9	45
: MAIN FRAME						
: ELECTRONIC MAIL	18	0	18	9	0	45
: WORD PROCESSING	9	0	0	0	9	18
: DATA BASE	63	0	0	18	0	91
: SPREADSHEET	0	0	27	0	0	27
: MODELING	9	0	9	9	9	36
: STATISTICS	9	9	0	9	9	36
: TUTORIALS	0	0	0	18	0	18
: DATA COMMUNICATIONS	0	0	0	0	0	0
: GRAPHICS	0	0	0	0	0	0

FIGURE F-11 GENERIC SOFTWARE USE

: SOURCE	ADVICE SCALES		
	ACCURACY	UNDERSTANDING	TIMELINESS
: IC	2.7	2.5	2.4
: USER GROUPS	7.0	6.8	7.3
: FRIENDS	5.0	5.3	6.5
: CO-WORKERS	3.3	3.5	5.3
: MANUALS	2.4	2.7	3.4
: MAGAZINES	6.3	5.3	2.9
: STORES	7.2	7.3	6.2
: OTHERS	3.5	3.0	7.8
: SUPERVISOR	5.2	3.8	2.4
: ASSISTANCE SCALES			
	PROCEDURAL	HW/SW	MICRO USE
: IC/MIS/DAMO	0.13	0.87	1.00
: MANUALS	0.38	0.00	0.00
: CO-WORKERS	0.26	0.00	0.00
: OTHERS	0.13	0.13	0.00
: SUPERVISOR	0.13	0.00	0.00

FIGURE F-12 MICRO COMPUTER ADVICE

APPENDIX G
ROCK ISLAND ARSENAL

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APPENDIX G
ROCK ISLAND ARSENAL

1.0 BACKGROUND

Rock Island Arsenal, Illinois is the headquarters of the Army Armament, Munitions and Chemical Command and has a population of 370 military and 10,000 civilians. The IC at Rock Island was implemented on 1 January 1985. A reorganization was expected 1 October 1986. Planning for the Center was initiated in September 1984. The installation has been working with an IC like concept for more than eight (8) years.

The IC at Rock Island has developed applications for users; an atypical function for an IC. Working closely with the end user, a Manpower Tracking System, an Acquisition Tracking Center, and several other applications have been developed for the installation.

The IC has developed a training course for managers, which includes demonstrations of the software packages most widely used on the Island. The course was prepared and is presented using Energraphics software, and a projection unit. This program has top management support, and has been recommended by the Commanding General. A copy of the DF to all Rock Island directorates, and a course outline is included in Appendix F of the Planning and Implementation Guide.

Each directorate at Rock Island has a Computer Coordinator (CC). This is a full time staff position. The CCs function as mini ICs. Users go to their CC first, when they have an ADP related problem. The CCs set up applications--often providing user friendly menus, distribute passwords, and provide one-on-one user training. The CCs use the IC as a resource when they have problems. Because the CCs are located in the directorate, their knowledge of the particular business area is often useful when helping the user.

1.1 PLANNING FACTORS

User needs and spectrum of hardware/software to be supported were the primary considerations of the IC planning committee. All departments participated in the survey which was done in conjunction with the development of an Office Automation Plan. One initial thrust was to supplement the existing PRIME network with INTELS. Another trade-off concerned the cost/capability comparisons of microcomputers versus sophisticated terminals.

1.2 MISSION SELECTION

Primary consideration was given to the following missions when planning for the IC:

- Improve relations between the DP activity and the user community,
- Reduce the DP backlog,
- Increase end user productivity,
- Standardize the procurement and utilization of microcomputer assets.
- Provide training for the end users in the use of computing assets,
- Assist the end users in developing new applications which will better utilize the computing assets available to him.

1.3 SERVICES PROVIDED

Figure G-1 shows a list of services which may be provided by any IC and denotes which services are currently being provided (height = 2) and those which will be provided in the near future (height = 1). No bar is shown for those services neither provided nor planned. All figures for this appendix are placed at the rear of the appendix, behind all text. The services are defined below:

- Assist end users in defining their computing needs,
- Assist end users in developing application using off-the-shelf software,
- Provide introductory training in the use of microcomputers and software (off-the shelf),
- Provide advanced training for users in the utilization of their hardware and software,
- Provide computer based training and tutorials to end users so that they may maintain their computer competence,
- Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,
- Provide custom programming assistance for end users developing microcomputer applications using other than off-the-shelf software,
- Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

Provide training and assistance to end users in installation of their hardware and software,

Provide training and assistance to end users in diagnosing problems with their hardware and software,

Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users' hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

Coordinate the establishment of User Groups to foster the exchange of information within the user community of events of interest,

Provide liaison between the end users and microcomputer hardware and software vendors,

Assist the end user in the procurement of microcomputer assets.

2.0 ANALYSIS OF IC OPERATIONS

The results of the interviews conducted during the evaluation visits have been analyzed with respect to the topics discussed in Chapter 6 of the Planning and Implementation Guide. The following sections discuss the findings as they relate to Marketing the IC, On-Going Operations of the IC, and Evaluation of Support Provide to the user community.

Section 2.1 discusses the methods utilized to market the IC's services, and provides a primary measure of the effectiveness of these efforts.

On-Going Operations of the IC are discussed in Section 2.2. The discussion included information about the internal operation of the IC, and utilization of the staff. The discussion also covers training methods and records maintained by the IC.

The value of the IC as seen from the users viewpoint is presented in Section 2.3. The section includes; (1) discussion of expressed needs of the users in terms of hardware, software, and training; (2) check list responses; and (3) rating of the IC as a source of assistance and information about micro computer usage.

2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation of a User's Manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

The IC is firming up plans to publish a news letter and to start a microcomputer users group. One of the objectives of the users group is to start a bulletin board and maintain a library of public domain software. There is a question concerning the legality of the use of government funds to make a donation to the developer for some of the software that is placed in the public domain sources with the request for a donation rather than setting a fee. A common comment received from the users interviewed was that they wished they could get more information about the IC. There was a desire for much more information interchange through either a newsletter or a users group.

The IC's manager's course has become an excellent marketing vehicle. The course has gained top management support, and makes an excellent vehicle to advertise the IC's services. There is a short, computer driven, IC briefing that is a companion to the manager's course. This briefing would be suitable for presentation at many management briefings to gain more visibility for the IC.

The IC uses the Computer Coordinators as a vehicle to get information to the users in their respective directorates, although there are no regularly scheduled meetings between the IC staff and the coordinators.

The IC has several different configurations of equipment set up for demo purposes. A user may also schedule time on one of the system to test new software or utilize one of the available tutorials. There is also a graphics production facility available.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure G-2 shows the fraction of the users that are aware of the true status of each of the services, and highlights services which require more marketing activity. The newsletter and user group in particular need attention.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategics and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) Manual should be developed to document these requirements and provide ready reference for the staff.

2.2.1 IC Organization

The main objectives of the IC are considered to be in the assisting of end users in processing their data on their terms in order to:

- Increase their productivity,
- Improve their decision making process,
- Make the user self-sufficient, and
- Provide a competency center for interactive products.

The first goal is to be able to satisfy all functional users and help them improve their ability to accomplish their workload. Progress will be measured in many ways including:

- The number of letters of appreciation and awards given to our staff members by functional users,
- The number of new requests for services,
- The number of trained users in the workplace,
- The number of new products researched and found to be of value to the functional users,
- Feedback from the users as to the contribution of IC staff members to their cost savings and/or productivity improvement.

There were no current user or staff manuals available which would detail the respective responsibilities of each. This may be due to the fact that the directorate is in the midst of a reorganization and all of the respective functions of each branch have not been fully resolved.

The IC has a staff of twelve, including the manager. All staff members are generalists, presumably capable of assisting any user with any problem, but each has been assigned responsibility to a subset of the products or equipment. For example, one is the expert on hardware problems, another with networks, another for data bases, etc. There is a feeling of lack of cross-fertilization because of this compartmentation, and a need for a great deal of coordination between staff members. There was also some confusion as to who was responsible for what, and who was backing up who. Staff members expressed a desire for more information about what hardware and software is out in the user community so they could know what support requests to expect.

In some ways the Directorate Computer Coordinators function as an extension of the staff of the IC, in that they are the first place the user can contact for advice on software, hardware, applications, and procurement.

2.2.2 IC Support Policies

The IC supports the full range of end user hardware from terminals on the PRIMENET, micro and mini nets, and stand alone micros. There is a variety of microcomputers; Victors, Leading Edge, Wyse, and IBM to name a few.

The IC has developed a list of recommended software that it will support to the best of its ability. Support for software not on the preferred list is not given the same priority, and the user is advised prior to purchase that support will be minimal. Lotus, Word Star, and dBase are the most commonly used packages for the IBMs and clones.

The IC provides the full range of support to users developing applications using off-the-shelf software packages, many times even to the point of actually doing the development for the user. The IC also provides assistance to users wishing to develop applications using other than the standard packages. Again the assistance runs from product selection through actual development in some cases.

The IC reviews all requests for hardware, and makes recommendations based upon standardization and configuration considerations.

The IC assists the user in getting access to the data he needs, but does not get involved in the actual extraction of the data from the data bases.

The staff is very strong on central computer access and service level issues, but not so in the microcomputer arena. Little evidence of emphasis on audit controls, risk assessment, and continuity of operations planning, or backup and recovery can be seen.

The IC surveys users every two (2) to three (3) months to ascertain training requirements. Responses are returned on a DF. The IC offers a three (3) day training course which is conducted by the Chicago office of the Office of Personnel Management (OPM). Commercially available paper and computer based tutorials are also available for users, by appointment.

The IC training course for managers gives excellent coverage to the capabilities of the standard software packages, but does nothing to enlighten managers of their responsibilities. Managers of units with a high degree of workplace automation begin to be exposed to the same risks as the central data processing installation. The issues of audit and risk assessment, backup and recovery and data security become more critical. Continuity of operation becomes a necessary way of life as office environments place more and more reliance on microcomputers.

2.2.3 Staff Awareness

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in Figure G-3. The value of the "aware" variable is computed as the fraction

of the staff members' responses that meet the awareness definition as defined in paragraph 2.1.2. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a breakdown in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementing stage. All of the staff members were not interviewed, and the data presented here may not accurately represent a cross-section of the staff. Staff awareness is high for all of the most commonly used services.

Comparison of the staff responses to the same policy questions posed to the manager, it is concluded that not all of the staff members are fully aware of the IC policies relative to hardware, software, procurement, and applications development. These staff members, however, are relatively new to the IC.

2.2.4 IC Staff Utilization

The utilization of personnel in the IC is shown Figure G-4. It shows the IC manager's estimate of the percent of his time is spent in each of the task areas. In Figure G-5, the IC manager's estimate of the percent of total time spent by his staff is compared to the normalized total percent of time calculated from the individual staff members estimates of their utilization, and is an estimate of the IC manager's feel for what tasks are taking up his staff's time. An indication of the assignment of special interest of a particular staff member is given by the percent of time that individual spends on the different tasks.

There is an agreement between the manager's estimate and the average on the identity of the large consumers of staff resources; training and consulting. The problem solution category is one that was written in by the staff members indicating a feeling that it is a separate activity from either consulting or training.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

Figure G-6 depicts the fraction of users actually utilizing the IC's services. A phantom use is said to occur when a user reports having obtained the service and the IC manager reports that service as not provided, or is in the planning stage and has not been fully implemented. The use of loaner equipment is the major case of a phantom use as shown in Figure G-6. The equipment that is currently utilized as a loaner has actually been received for some other user, but that user has not yet received the necessary training and is not ready to utilize it.

Current support requirements are reflected in Figure G-7. The variable (cur-need) added to this plot depicts the case wherein the user reports a belief that the service is not provided and the IC manager reports the service as being provided, and the user reports that the service would be utilized if it were available. The addition of the cur-need inputs creates some additional demand for nearly all of the services provided. The largest current need shown is for hotline, which indicates a need to give wider distribution of the hotline number and the procedures for contacting the IC.

The information contained in Figure G-8 tends to show the direction the IC should be going when it is to meet the future demands for services. In this figure, an additional variable, fut-need, is added. A future need is defined as the case where the user indicates no need for the service at the present time, but can foresee the need within the next year. There are no large demands reflected in Figure G-8, therefore the IC can concentrate on trying to improve the service given to the customers, particularly in those high demand areas as shown by needs at or nearly equal to 1.

2.3.2 Other User Needs

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in Figure G-9. The major complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability. The results show, at least for the users interviewed, that these users are not to be categorized as novice users. The IC should be investigating new technology in the area of larger hard discs and better backup systems for their hard discs. It can also be anticipated that the demand for the use of the plotting facility in the IC will increase dramatically unless additional plotters are provided for the users.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired should be capable of easily developing report formats and extracting data

from several different files with different characteristics. Software desires exhibit the same level of user expertise as the hardware. Data communications (micro network and/or mainframe link), and software interface are the big items. The IC should direct its technical research toward finding new software that is acceptable for these purposes.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure G-10 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. Interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using of that software is needed.

2.3.3 Generic Software Used

Figure G-11 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are word processing, data base and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas.

2.3.4 Training

Seven out of nine of the users interviewed had taken training courses. Most of them rated their experience as moderate. The Intel System Administrator course left much to be desired. A common complaint was not enough training available and not the right course when it is needed. The available tutorials and software demo discs were also rated as next to worthless. Nearly all users expressed a strong desire or training. The novice for introductory level so he can get started, and the more experienced user wants to learn advanced techniques to get the most out of his equipment.

2.3.5 Productivity Increases

All of the users interviewed reported significant gains in productivity, that of being able to do things not done before, or in doing the same thing in significantly less time. One user reported that, it had not been required for him to worked any overtime in three months.

2.3.6 Advice Scales

Figure G-12 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The scores, on the advice scales, for the IC, co-workers, and manuals are significantly better than those of the other sources, but the difference between the scores among those three is not significant. This suggests the theory that a user with the problem will seek the source that is the handiest of the three at the time. A good responsive help desk will increase the probability of the user seeking aid from the IC. On the other hand a knowledgeable co-worker, if sufficiently well trained, would possibly be able to solve some of the more mundane problems immediately and keep the help line open for the more serious problems. It also should be made a hard fast policy, so stated in the User's Manual, that the user reads the manual before calling the help desk.

The IC was selected as the place to go for microcomputer assistance by a large margin over the other choices. The computer coordinator made a showing for procedural and for hardware/software assistance, again showing that properly instructed this person can be a valuable ally to the IC.

2.3.7 Control Issues

Users interviewed who used terminals from a mainframe (or mini) were well aware of the Central Computer Control Access and service level issues. Backup and recovery issues were for the most part, on a nonscheduled basis. Most backup data and program discs were not physically remote from the workstation. Continuity of operation had not occurred to most users, nor had documentation of their applications.

FIGURE G-1 SERVICES PROVIDED
ROCK ISLAND ARSENAL

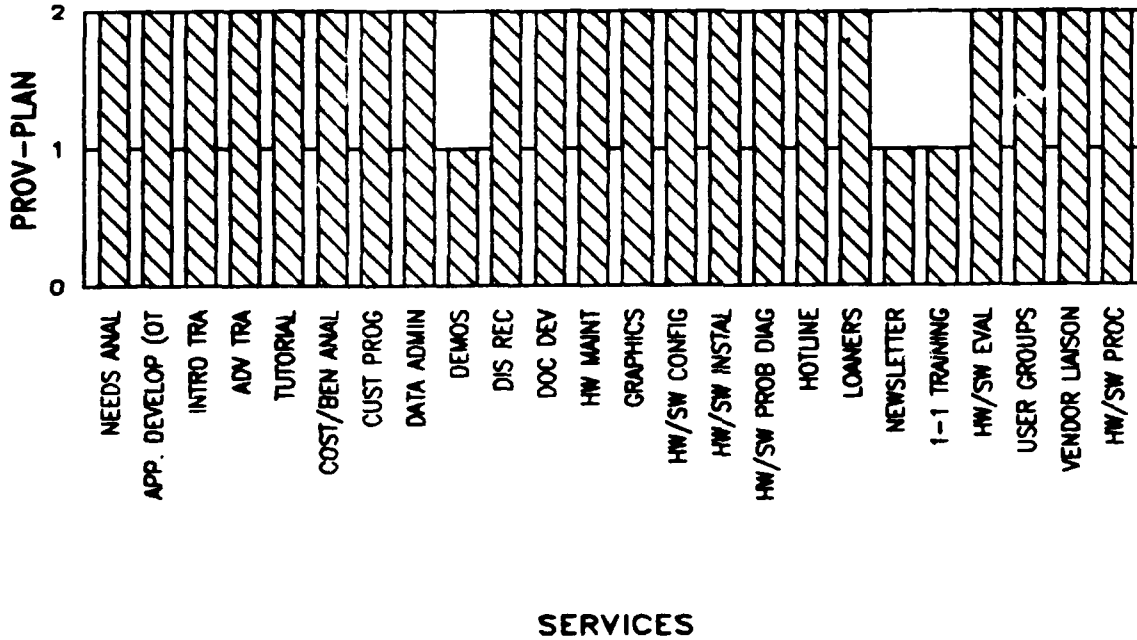
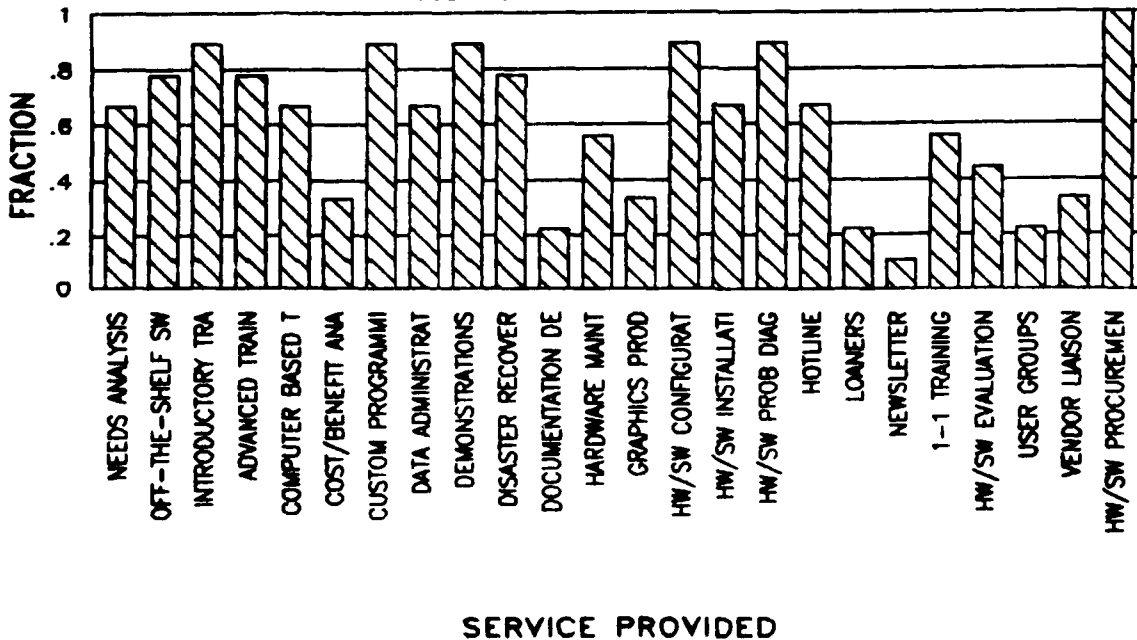
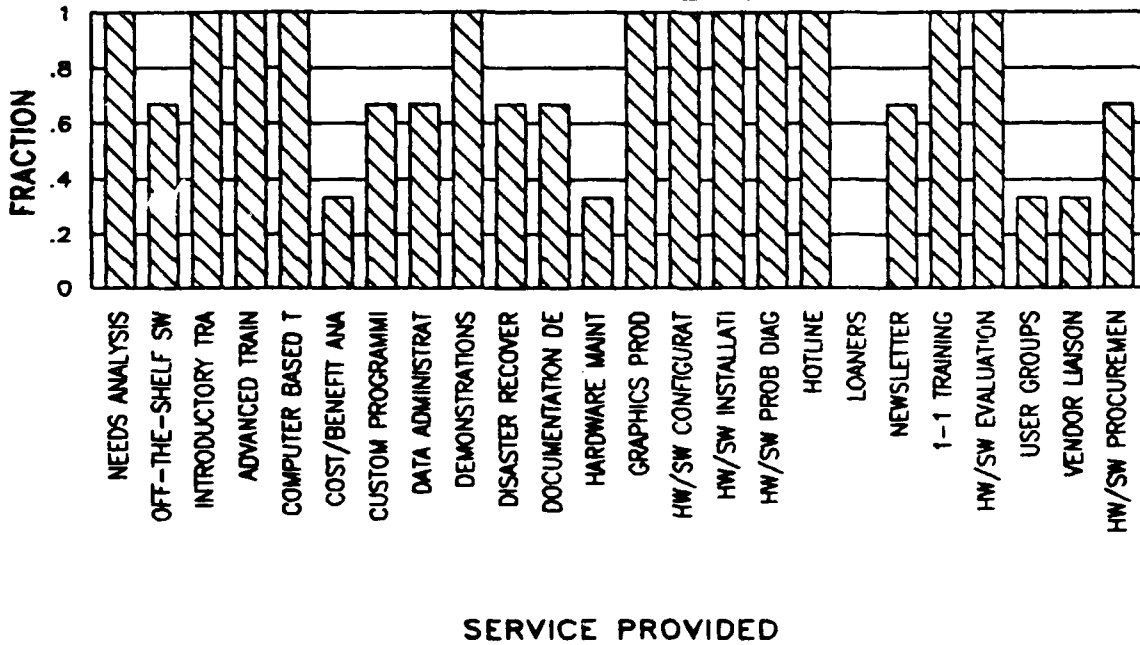


FIGURE G-2 USER AWARENESS
ROCK ISLAND ARSENAL



**FIGURE G-3 STAFF AWARENESS
ROCK ISLAND ARSENAL**



IC MANAGER	
TASK	PERCENT
STAFF TRAINING	5
USER TRAINING	25
DEMONSTRATIONS	5
LIAISON WITH DP	5
LIAISON WITH USERS	10
BUDGET PREPARATION	10
HW/SW REQUISITIONS	10
PLANNING	15
SCHEDULING	5

FIGURE G-4

PERCENT OF WORK					
STAFF TASK	IC MGR EST.	AVG EST.	STAFF1 EST.	STAFF2 EST.	STAFF3 EST.
USER TRAINING	20.0	24.5	5.0	38.5	30.0
HW/SW ACQUIS'N	15.0	6.7	20.0	.0	.0
HW/SW EVALUATION	10.0	8.5	10.0	15.4	.0
SW LIBRARY	5.0	1.7	5.0	.0	.0
USER GROUPS	5.0	1.7	5.0	.0	.0
CONSULTING	30.0	20.1	20.0	15.4	25.0
DEMONSTRATIONS	10.0	6.8	5.0	15.4	.0
MAINTENANCE	1.0	1.7	5.0	.0	.0
LIAISON WITH DP	2.0	5.0	5.0	.0	10.0
HW/SW INSTALL	2.0	8.5	10.0	15.4	.0
PROB SOLUTION	.0	15.0	10.0	.0	35.0

FIGURE G-5 STAFF TIME DISTRIBUTION

FIGURE G-6 SERVICE UTILIZATION
ROCK ISLAND ARSENAL

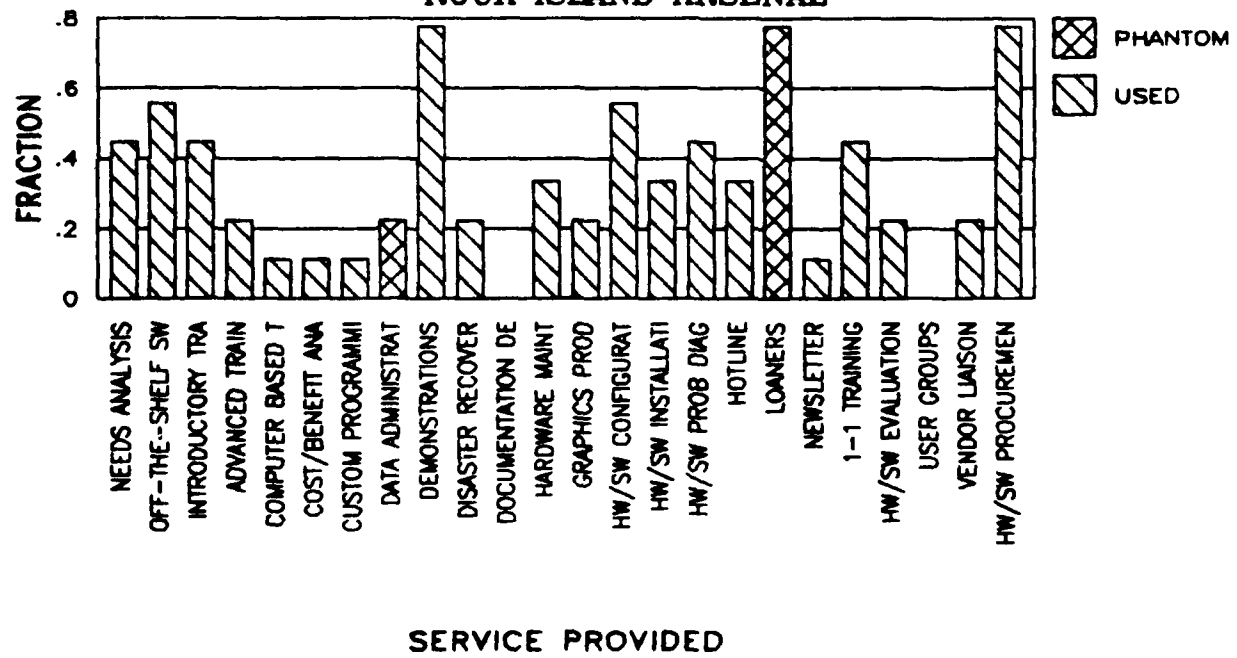


FIGURE G-7 CURRENT REQUIREMENTS

ROCK ISLAND ARSENAL

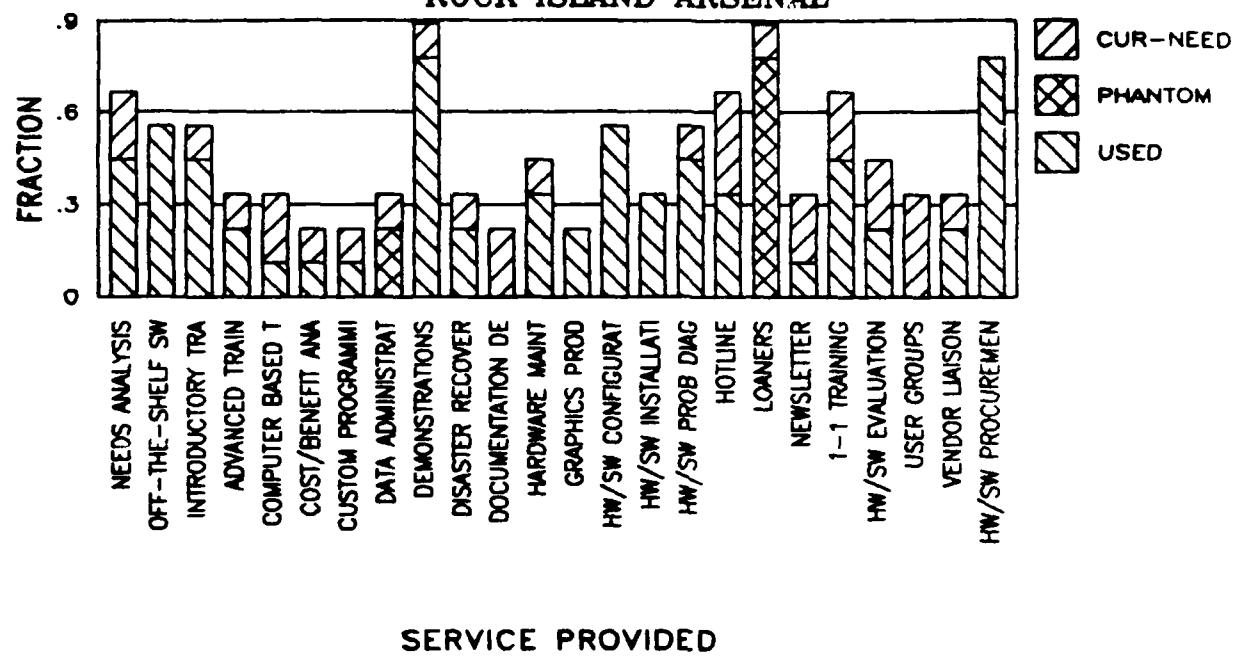
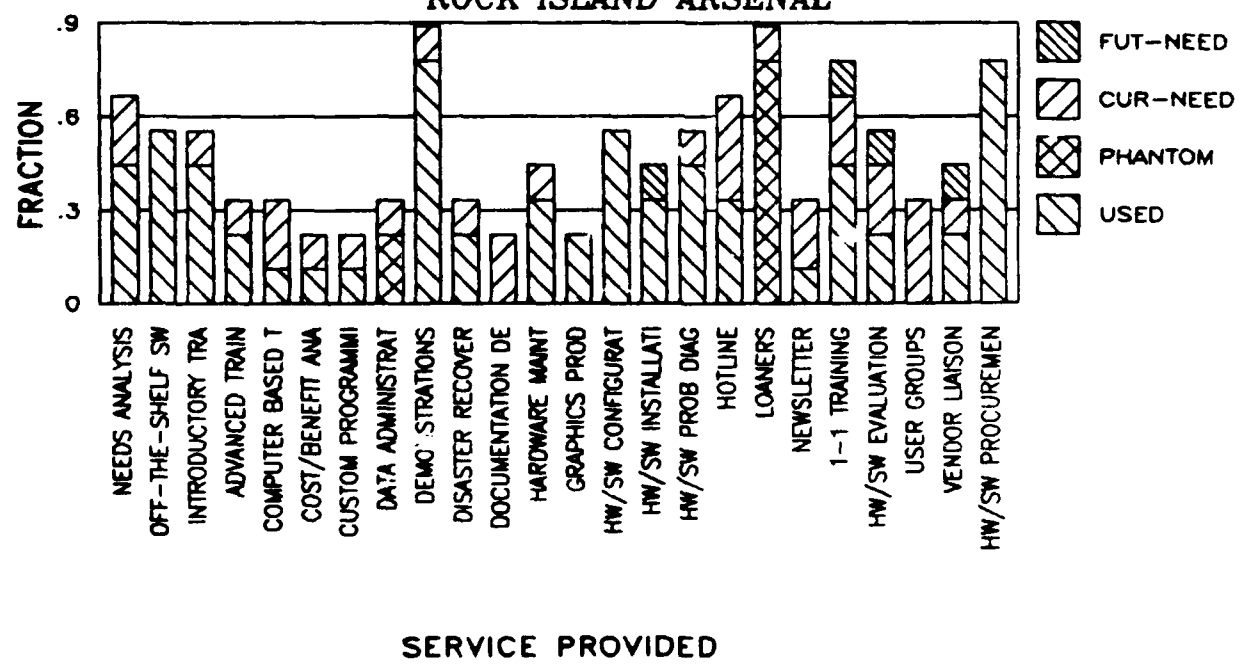


FIGURE G-8 FUTURE REQUIREMENTS

ROCK ISLAND ARSENAL



HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	33
HARD DISC	
LARGER HARD DISC	55
MORE CONVENIENT BACKUP	55
BETTER MONITOR	22
MODEM	
PLOTTER	55
PRINTER	
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	55
SOFTWARE INTERFACE	77
REPORT GENERATOR	22
STATISTICAL PACKAGES	33
DECISION SUPPORT SYSTEM	22
WINDOWS	33
MICRO NETWORK	55

FIGURE G-9 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	77
2. NEW OFFERINGS	66
3. HARDWARE	33
4. SOFTWARE	77
5. MAIN FRAME	88

FIGURE G-10 KNOWLEDGE

: CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
: ELECTRONIC MAIL	11					11
: WORD PROCESSING	44	11	11			66
: DATA BASE	55	11		22		88
: SPREADSHEET	22	44	11	11		88
: MODELING			33			33
: STATISTICS	11	11	11		11	44
: TUTORIALS			11	44	22	77
: DATA COMMUNICATIONS	33	11	11			55
: GRAPHICS		11	11	22	33	77
: MAIN FRAME						
: ELECTRONIC MAIL		25	25	25		75
: WORD PROCESSING				25		25
: DATA BASE	25	25				50
: SPREADSHEET				25		25
: MODELING						
: STATISTICS			25			25
: TUTORIALS						
: DATA COMMUNICATIONS	25		25	25		75
: GRAPHICS				25		25

FIGURE G-11 GENERIC SOFTWARE USE

: SOURCE	ADVICE SCALES		
	ACCURACY	UNDERSTANDING	TIMELINESS
: IC	1.9	1.9	2.5
: USER GROUPS	5.5	4.2	5.3
: FRIENDS	7.3	6.2	7.0
: CO-WORKER	2.7	2.2	2.0
: MANUALS	2.9	3.8	2.9
: MAGAZINES	5.0	5.4	6.2
: STORES	6.0	4.2	4.5
: OTHERS	4.8	5.5	4.5
: SUPERVISOR	8.2	8.0	7.6
: ASSISTANCE SCALES			
	PROCEDURAL	HW/SW	MICRO USE
: IC	44	77	77
: MANUALS	23	11	00
: CO-WORKER	22	00	11
: COMP COORD	11	11	00
: STORE	00	00	11
: COTHER	00	00	11

FIGURE G-12 MICRO COMPUTER ADVICE SCALES

APPENDIX H
FORT ORD

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APPENDIX H
FORT ORD

1.0 BACKGROUND

Fort Ord, California is the home of the 7th Infantry Division, and has a population of 20,000 military and 3,500 civilians. The IC was an outgrowth of the 1983 ISP; the Center was officially implemented in April 1985, and currently occupies two (2) buildings. One building is devoted to training, and is also the location of the help desk. The second building includes staff offices, and the software library.

The IC is involved in two local-unique systems development projects that are beyond the scope of the normal IC activities. One, the Law Enforcement Enhancement System (LEES), is a value-added interactive extension of the Military Police Management Information System (MPMIS). This system, due for implementation this year will provide a sophisticated interactive relational data base, accessible through a user friendly interfaces, to correlate and deliver crime, traffic, vehicle, and personnel information to fixed and mobile terminals. The LEES will also compile information and perform format conversion for MPMIS reporting. Another system, to follow in fiscal year 1987, is the Fort ORD Automated Installation Management System (AIMS). AIMS is a similar interactive system using a relational data base, supported by high-quality mainframe graphics, to provide senior management, program directors, and supporting staff relational data against measurable performance criteria established by DA, FORSCOM, and Fort Ord senior management.

Fort Ord has a wide area network (WAN) that is designed to provide connectivity for all terminals and PCs on the installation having the requirement to communicate, including tactical terminals such as TAAS when in garrison. The IC provides network management and user assistance for the network. Gateways to STARNET and the Defense Data Network (DDN) are planned.

1.1 PLANNING FACTORS

The IC is an outgrowth of the ISP. The primary concerns addressed by the planning group were the needs of the users and the kinds of hardware and software that would have to be supported. During the conduct of the ISP, all departments participated in the surveys.

1.2 MISSION SELECTION

The primary missions considered during the planning phase were increasing productivity of end users, provide standardization of micro-computer hardware and software, provide training for the end users in the use of microcomputers in their workplace, and evaluate new technology for suitability to the end users needs.

1.3 SERVICES PROVIDED

Figure H-1 shows a list of services which may be provided by any IC and denotes which services are currently being provided (height = 2) and those which will be provided in the near future (height = 1). No bar is shown for those services neither provided nor planned. All figures for this appendix are placed in the rear of the appendix, behind all text. The services are defined below:

Assist end users in defining their computing needs,

Assist end users in developing application using off-the-shelf software,

Provide introductory training in the use of microcomputers and software (off-the shelf),

Provide advanced training for users in the utilization of their hardware and software,

Provide computer based training and tutorials to end users so that they may maintain their computer competence,

Assist end users in conducting cost/benefit analysis for justification of purchase of microcomputer hardware and software,

Provide custom programming assistance for end users developing microcomputer applications using other than off-the-shelf software,

Assist end users in obtaining access to the data needed, interfacing with the data administration function as required,

Provide demonstrations of microcomputer hardware and software for the end users,

Provide training and assistance for end users in recovering lost data due to equipment malfunction,

Provide assistance and facilities for end users to document their applications,

Provide assistance to end users in maintenance of the microcomputer hardware,

Provide facilities for the production of computer generated graphic charts and graphs,

Assist the end users in determining the best hardware/software configuration to meet their processing needs,

Provide training and assistance to end users in installation of their hardware and software,

Provide training and assistance to end users in diagnosing problems with their hardware and software,

Establish a single point of contact for users to utilize in obtaining assistance with computer related problems,

Provide hardware for use, on a loan basis, when the end users' hardware is down for repairs,

Publish a newsletter on a routine basis to keep end users up to date on new developments in hardware, software, and applications,

Provide one-on-one training for end users when necessary,

Perform evaluations of new hardware and software, and make recommendations as to the utility of such to the user community,

Coordinate the establishment of User Groups to foster the exchange of information within the user community of events of interest,

Provide liaison between the end users and microcomputer hardware and software vendors,

Assist the end user in the procurement of microcomputer assets.

2.0 ANALYSIS OF IC OPERATIONS

The results of the interviews conducted during the evaluation visits have been analyzed with respect to the topics discussed in chapter 6 of the Planning and Implementation Guide. The following sections discuss the findings as they relate to Marketing of IC, On-Going Operations of the IC, Evaluation of Support Provide to the user community.

Section 2.1 discusses the methods utilized to market the IC's services, and provides a primary measure of the effectiveness of these efforts.

On-Going Operations of the IC are discussed in section 2.2. The discussion included information about the internal operation of the IC, and utilization of the staff. The discussion also covers training methods and records maintained by the IC.

The value of the IC as seen from the users viewpoint is presented in section 2.3. The section includes; (1) discussion of expressed needs of the users in terms of hardware, software, and training; (2) check list responses; and (3) rating of the IC as a source of assistance and information about micro computer usage.

2.1 MARKETING THE IC

The Planning and Implementation Guide describes several techniques for marketing the services provided by the IC. These techniques include publishing a newsletter, formation of user groups, promulgation a users manual, and conducting demonstrations of new hardware and software in the IC.

2.1.1 Marketing Techniques Used

The Center maintains a software library which contains four (4) to six (6) copies of popular software packages, including several tutorials. Users can check-out software from the library.

The IC has developed a three page handout which provides a summary description of the IC and the major functions it performs.

The IC maintains a microcomputer Bulletin Board (BB) and has access to public domain software through this bulletin board.

Both a newsletter and a users group are planned to be started within the next year.

2.1.2 User Awareness

An estimate of the success of IC's marketing program is obtained from a comparison of the list of services provided with the responses to the user survey concerning services available from the IC. Each user interviewed was given a list of services which could be provided by any IC. The user was then asked to indicate; (1) if he believed that the service was provided by the IC, (2) indicate whether or not the service has been personally used by that user, (3) if not provided, indicate whether there was a current need for the service if it were available, and (4) if not provided, indicate if it were predicted that the service would be utilized within the next year. The user is said to be aware of the service if his response and the managers response meet the following criteria:

If the manager says the service is provided and the user says it is either provided or has been used.

If the manager reports the service is not provided or being planned, and the user reports either not provided or a need for the service.

All other combinations of manager and user response are not considered as aware responses.

Figure H-2 shows the fraction of the users that are aware of the true status of each of the services, and highlights services which require more marketing activity.

2.2 ON-GOING OPERATIONS

Chapter six of the Planning and Implementation Guide provides several strategies for continued success of the IC. The IC must maintain an awareness of command strategies, current technology trends, and end user computing needs. There should be definable and measurable objectives with appropriate milestones established for the IC. The staff should be fully aware of the strategies and procedures necessary to achieve the objectives and meet scheduled milestones. A Standard Operating Procedures (SOP) manual should be developed to document these requirements and provide ready reference for the staff.

2.2.1 IC Organization

The major objectives for the IC include training, system design and procurement, installation, network management and PROFS.

In training the IC shall provide lecture and hands-on training courses to the end users. It may be accomplished in a classroom or one-on-one setting.

The IC shall help the user to define their requirements and then do the hardware and software configurations from those requirements.

New hardware and software are installed at the user's site. The hardware and software is first tested in the IC prior to being delivered to the site.

The IC has the responsibility to train and support the users on the Professional Office System (PROFS).

The IC provides network management and user assistance for the Wide Area Network.

A two-year projection of work tasks for the IC was developed in November 1985. The projection included seventeen line items, some of them multi-part. The major items are summarized below:

provide an instruction center for all computer systems (PCs and main-frame). Courses to be offered include introductory, intermediate, and advanced courses on end user workstations; and continuing education courses to users in existing software as well as any new software requirements,

provide consultation services for all end users and managers, including diagnostic checks, software and hardware maintenance, and software evaluation,

develop software and hardware configurations, and

set up and be responsible for local area networking.

The IC has developed an internal IC procedures manual which provides guidance to the staff members as to the responsibilities of the IC and the methods of performing services for the users.

A trouble tracking sheet has been developed by the IC. A copy of this sheet is located in Appendix F of the Planning and Implementation Guide. This system ensures that trouble calls are followed until the problem is resolved. Failure to adequately follow up on incoming trouble calls was considered to be one of this IC biggest headaches prior to the development of the sheet.

The IC has a staff of eight people, including the manager. Six are civilian and the other two are military. The two military staff members mainly man the help desk. All of the civilian employees are temporary overhires. There is some morale problems because of the unknown aspect of job security. Staff members are specialists in one or more of the following; training, mainframe interfaces, microcomputers, or networks.

There are at least two other ICs on the installation, but there appears to be minimal contact between them, training being about the only service that the other IC's utilize. The IC within the Engineering Command is the exception, with a great deal of close coordination between them in some areas.

2.2.2 IC Support policies

The IC assists the users in requirements definition, hardware and software configuration and acquisition documentation. It conducts research of available government and industry sources to maintain awareness of cost effective, solution-oriented hardware and software to meet user needs. In all acquisitions, vendor maintenance is sought to ensure system reliability. The IC manages the contracting and configuration aspects of procurement. Moneys are transferred to the IC for purchases. When the hardware and software is received, it is hand receipted to the users from the IC.

As new systems are fielded, advance training of users is conducted; equipment and software assembled, tested, and placed in the users environment; and follow-up training and assistance are provided to the users as necessary.

Systems maintenance, systems upgrade and replacement, mission changes, and personnel turnover demand continuing interface with the users. The IC serves as the central point of contact for user queries about vendor maintenance of information systems, requests for assistance, and update training. When necessary, IC personnel conduct hardware and software troubleshooting and limited equipment repair by component replacement.

The IC provides individual consultation or training with experienced users on new equipment, systems refinements, productivity enhancements, and development of quality presentation graphics.

The IC performs the function of data base management because it is user centered. It manages the file structures, access, and data base maintenance in order to maximize information exchange and correlation, and to minimize data storage space.

The IC has developed training courses, including paper tutorials. These tutorials allow the user to replicate the classroom exercises after he returns to the office. The classes meet for half a day, for one week. The instructors, members of the IC staff, are also available for one-on-one consultations with users. The computer classroom is available to users when courses are not in session. The classroom is currently furnished with six (6) PC borrowed from the functional areas; the IC has it own PCs on order. Initially, the IC scheduled users for training. This function was recently turned over to the CPO. The IC is currently considering arranging classes according to GS grade level to ensure more homogeneity in the classroom.

The IC staff members interviewed did not appear to be concerned with the control issues of audit, risk assessment, continuity of operation, backup and recovery, and data security as one would expect, considering the scope of the IC's responsibilities.

2.2.3 Staff Awareness

A measure of the degree to which IC staff members are kept aware of the status of the implementation of various services of the IC is shown in figure H-3. The value of the "aware" variable is computed as the fraction of the staff members' responses that meet the awareness definition of awareness as defined in paragraph 2.1.2. In general, a high fraction of awareness denotes good internal communications between the staff and the IC manager. Where the IC staff is organized into groups of technical or product specialists, there is a risk of a member losing touch with what is happening in the other parts of the staff. A low fraction of the awareness factor, then, can be interpreted as the indication of a breakdown in communications within the staff and between the staff and the IC manager. A low awareness factor may also denote a degree of uncertainty as to the exact status of a service that is in the planning or implementing stage. All of the staff members were not interviewed, and the data presented here may not accurately represent a cross section of the staff.

There is an extremely high degree of correlation between the services said to be offered and the staff awareness as Figure H-3 shows. This implies that there is a great deal of information sharing within the staff.

2.2.4 IC Staff Utilization

The utilization of personnel in the IC is shown figure H-4. It shows the IC manager's estimate of the percent of his time is spent in each of the task areas. In figure H-5, the IC manager's estimate of the percent of total time spent by his staff is compared to the normalized total percent of time calculated from the individual staff members estimates of their

utilization, and is an estimate of the IC manager's feel for what tasks are taking up his staff's time. An indication of the assignment of special interest of a particular staff member is given by the percent of time that individual spends on the different tasks.

Two of the staff members interviewed were training specialists (Staff1 and Staff2 above), therefore it is not unexpected to see a large difference in the training area. Had more staff members from other parts of the IC been included, the results would be different. It is felt that no valid conclusions can be made from this data because of the small sample size.

2.3 EVALUATION OF IC OPERATION

The evaluation of IC operation is based primarily upon the results of the user interviews. It consists of discussions of the stated user needs with respect to services of the IC, hardware and software needs, knowledge needs, productivity improvements, training, microcomputer usage issues, and utility of the IC.

2.3.1 Utilization of IC Services

Figure H-6 depicts the fraction of users actually utilizing the IC's services. A phantom use is said to occur when a user reports having obtained the service and the IC manager reports that service as not provided, or is in the planning stage and has not been fully implemented. The use of loaner equipment is the major case of a phantom use as shown in figure H-6.

The low level of usage of the IC most likely stems from the fact that many of the users and/or prospective users are either waiting for hardware or training. The entries for computer based training refers to the use of the tutors accompanying many of the popular software packages.

Current support requirements are reflected in figure H-7. The variable (cur-need) added to this plot depicts the case where the user reports a belief that the service is not provided and the IC manager reports the service as being provided, and the user reports that the service would be utilized if it were available. There are three significant current needs reflected; advanced training, newsletter, and user groups.

The information contained in figure H-8 tends to show the direction the IC should be going when it is to meet the future demands for services. In this figure, an additional variable, fut-need, is added. A future need is defined as the case where the user indicates no need for the service at the present time, but can foresee the need within the next year. There are no large demands reflected in figure H-8, therefore the IC can concentrate on trying to improve the service given to the customers, particularly in those high demand areas as shown by needs at or nearly equal to 1.

2.3.2 Other User Needs

The users were asked about possible hardware and software limitations which they believed hindered their capability to fully utilize their systems. The results of the survey are summarized in figure H-9. The major complaints about backup for the hard disc stem from the use of a floppy disc based backup, with the attendant time and disc investment required. Printer needs were primarily expressed in terms of faster and easier to use letter quality. Monitor complaints centered upon the lack of graphics capability. Hard discs, backup equipment and printers head the list of hardware desired. The printer wishes were for three color printers and one with a wider carriage. The common complaint with current backup systems is the length of time required to backup a hard disc and the large number of floppy discs required.

The software interface related complaints referred to the limited capability of many of the standard software packages to import data files from another without use of a separate utility program. In addition, utility packages do not exist for converting files for all the standard off-the-shelf software packages. The report generator capability desired should be capable of easily developing report formats and extracting data from several different files with different characteristics.

All of the users interviewed were very interested in furthering their knowledge and increasing their proficiency in end user computing. Figure H-10 is a summary of the users response to queries relating to the topics shown. Programming wants included the use of both compilers/interpreters and advanced techniques of using standard packages such as data base management and spreadsheets. The information category, new offerings refers to information directly relating to their workplace needs and does not cover the broad spectrum of product advertisement and promotional materials. Interest in learning more about the internal technical details of the hardware in use was also prevalent. The users also expressed interest in obtaining more technically advanced information about the software they were currently using. Main frame use referred to both the use of micro-main frame links and remote terminals. Categories 1, 3, and 4 indicate the need for advanced training, and provide some guidance for defining the required course content. Category 5 depends upon the availability of suitable main frame software. If such software (such as PROFS) is available, then a need for training in using that software is needed. Figure H-10 infers that this group of users is extremely thirsty for knowledge related to end user computing. This was verified by the comments from almost all of the users interviewed. There was a loud cry for more information, and more training at all levels from introductory to advanced.

2.3.3 Generic Software Used

Figure H-11 provides a breakdown of the generic types of software used by those interviewed. The most heavily utilized software types are word processing, data base and spreadsheets indicating that the training plans should emphasize basic and advanced training in those areas.

2.3.4 Training

Nine out of twelve of the users interviewed had taken training courses. Most of them rated their experience as positive to outstanding. There were also numerous complaints about the waiting list for the courses. The second most prevalent complaint concerned the amount of material covered in the short time scheduled for the course. Another complaint mentioned the mixing of students with different education levels and different skill needs in the same class. It has been determined that there are three different classes of users, the executive user, the professional staff user and the clerical user. The executive user's needs tend toward decision support and time management type tools, the professional staff toward spreadsheets data base and statistical analysis packages and the clerical user is most interested in word processing skills. The training classes should be made up of students with the same skill requirements.

2.3.5 Productivity Increases

Most of the users interviewed reported productivity gains ranging from a factor of 10:1 to as low as 2:1. Some users were becoming frustrated, however because they had a taste of what end user computing could do for them and wanted to know how to get more out of their systems, but could not get the advanced training necessary. One user reported that after waiting almost six months for training, he became a customer of the instruction manual after marketing and purchasing several "how to" manuals written by experts other than the publisher of software.

2.3.6 Advice Scales

Figure H-12 shows the list of possible sources of information about computing related problems. The users were asked to rank these sources with respect to the accuracy, understandability, and timeliness of the information received. The average ranking of each source is shown in the score column in the first half of the figure. The users were also asked who they would turn to for help with procedural problems, hardware or software problems, and microcomputer use in general. The results, in terms of the fraction of users reporting each is shown in the three columns of the second part of the figure.

The scores for the IC and instruction manuals on the advice scales are significantly better than the scores for the other sources on all three measures: accuracy, understandability, and timeliness. It shows that the IC has established a good reputation in the user community. It is also confirmed by the clear preference for the IC on the assistance scales.

2.3.7 Control Issues

Users interviewed who used terminals from a mainframe (or mini) were well aware of the Central Computer Control Access and service level issues. Backup and recovery issues were for the most part, on a nonscheduled basis. Most backup data and program discs were not physically remote from the workstation. Continuity of operation had not occurred to most, nor had documentation of their applications.

FIGURE H-1 SERVICES PROVIDED
FORT ORD

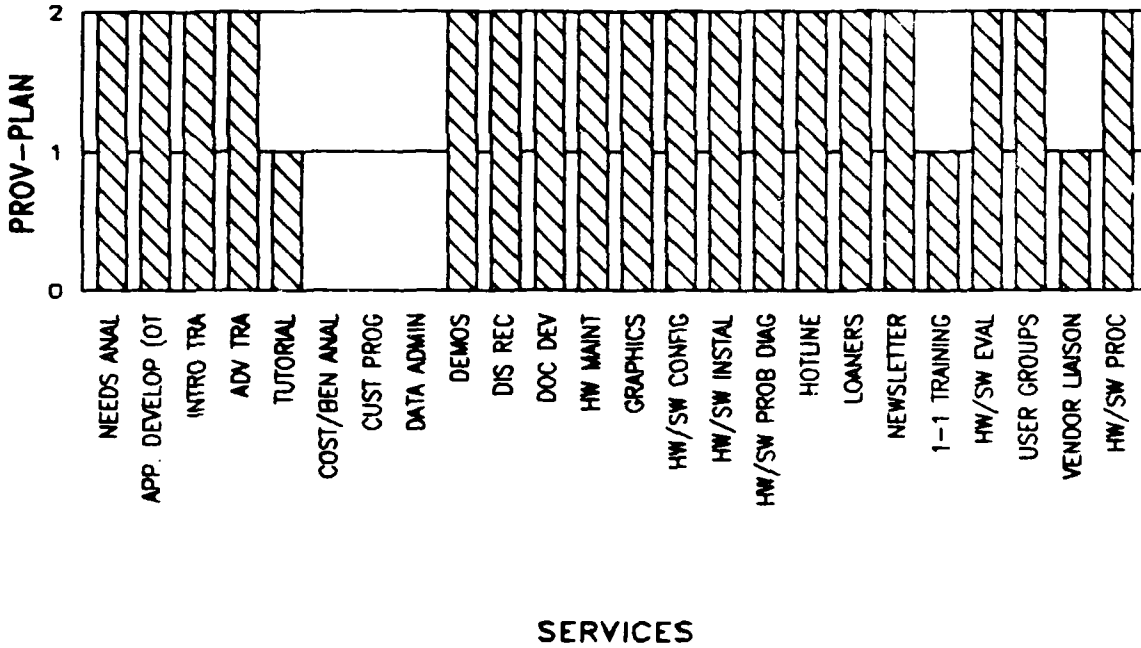
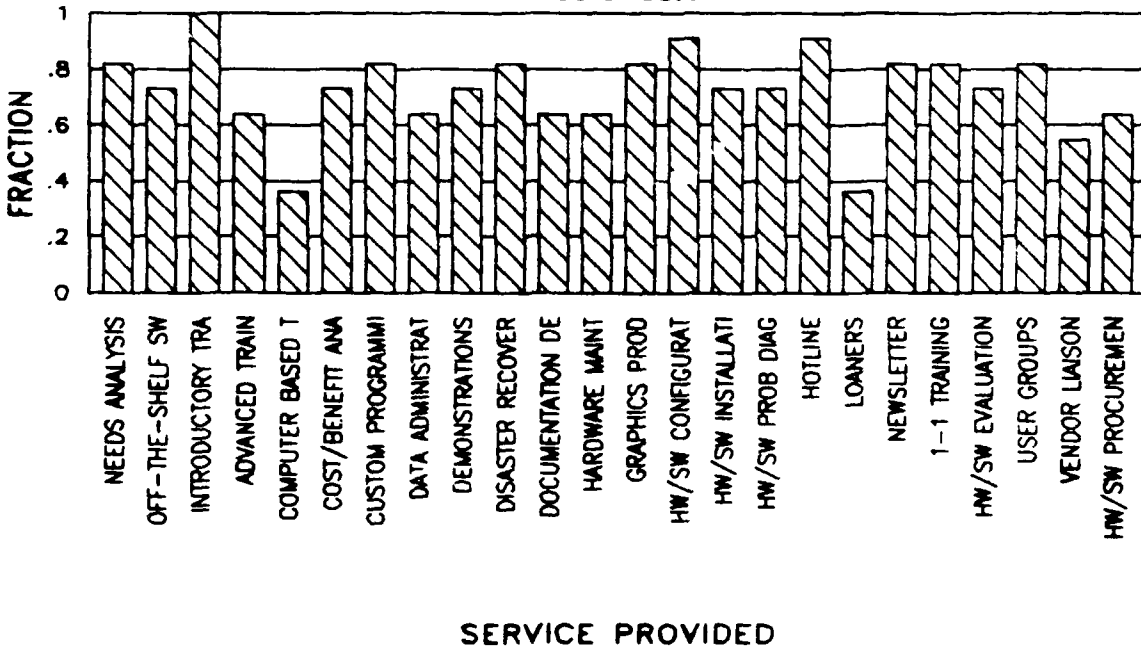
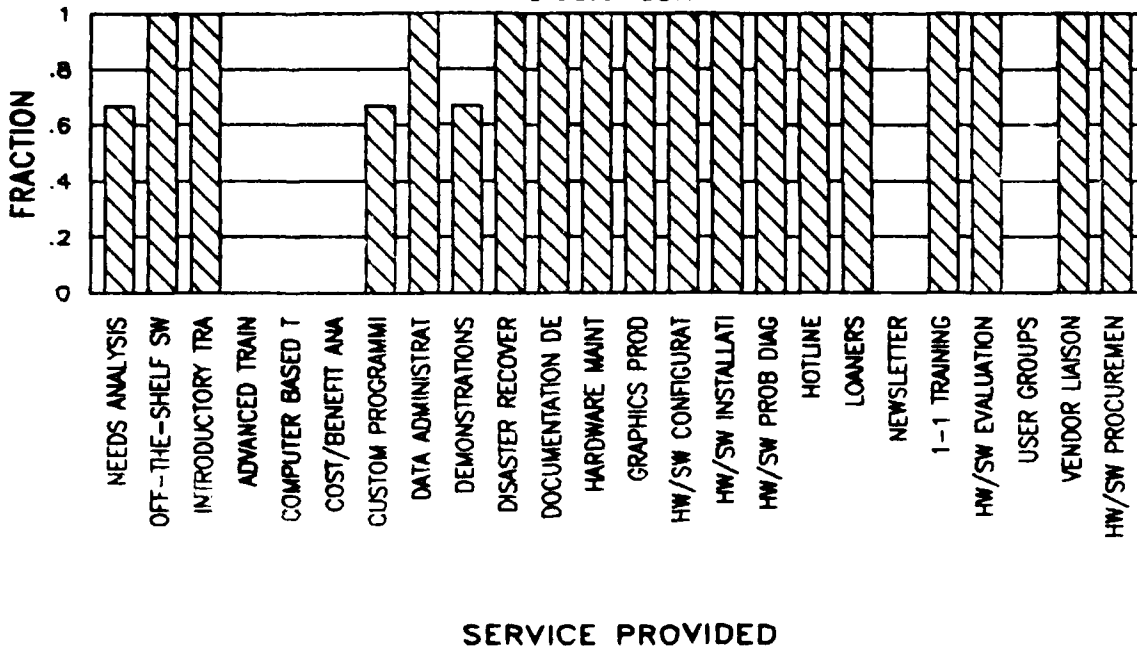


FIGURE H-2 USER AWARENESS
FORT ORD



**FIGURE H-3 STAFF AWARENESS
FORT ORD**



IC MANAGER	
TASK	PERCENT
STAFF TRAINING	10
USER TRAINING	10
DEMONSTRATIONS	5
LIAISON WITH DP	20
LIAISON WITH USERS	20
BUDGET PREPARATION	
HW/SW REQUISITIONS	5
PLANNING	10
SCHEDULING	10
PROCUREMENT	10

FIGURE H-4 IC MANAGER TIME DISTRIBUTION

PERCENT OF WORK					
STAFF TASK	IC MGR EST.	AVG EST.	STAFF1 EST.	STAFF2 EST.	STAFF3 EST.
USER TRAINING	25.8	38.9	60.0	40.0	16.7
HW/SW ACQUIS'N	3.2	10.0	30.0	.0	.0
HW/SW EVALUATION	3.2	14.3	5.0	10.0	27.8
SW LIBRARY	3.2	12.8	5.0	.0	33.3
USER GROUPS		4.6			13.9
CONSULTING	32.3	11.9	.0	30.4	5.5
DEMONSTRATIONS	6.5		.0	.4	.0
MAINTENANCE	12.9		.0	.0	.0
LIAISON WITH DP	3.2	.9	.0	.0	2.8
HW/SW INSTALL	9.7		.0	.4	.0
PROB SOLUTION		6.7	.0	20.0	35.0

FIGURE H-5 STAFF TIME DISTRIBUTION

FIGURE H-6 SERVICE UTILIZATION
FORT ORD

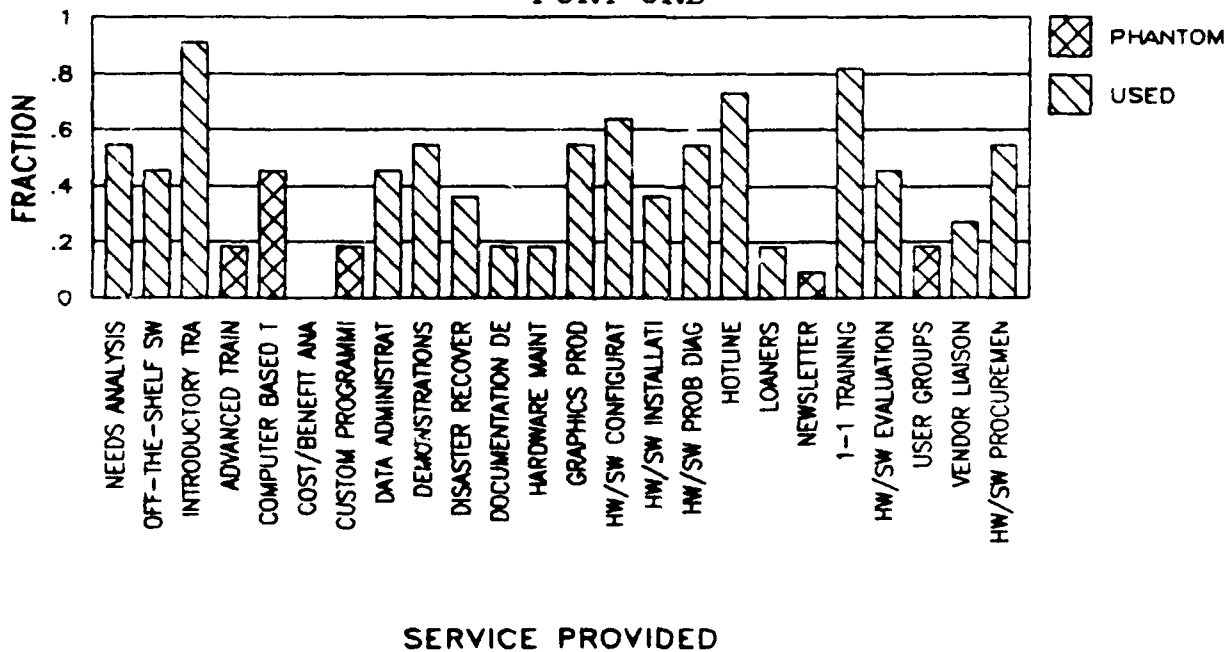


FIGURE H-7 CURRENT REQUIREMENTS
FORT ORD

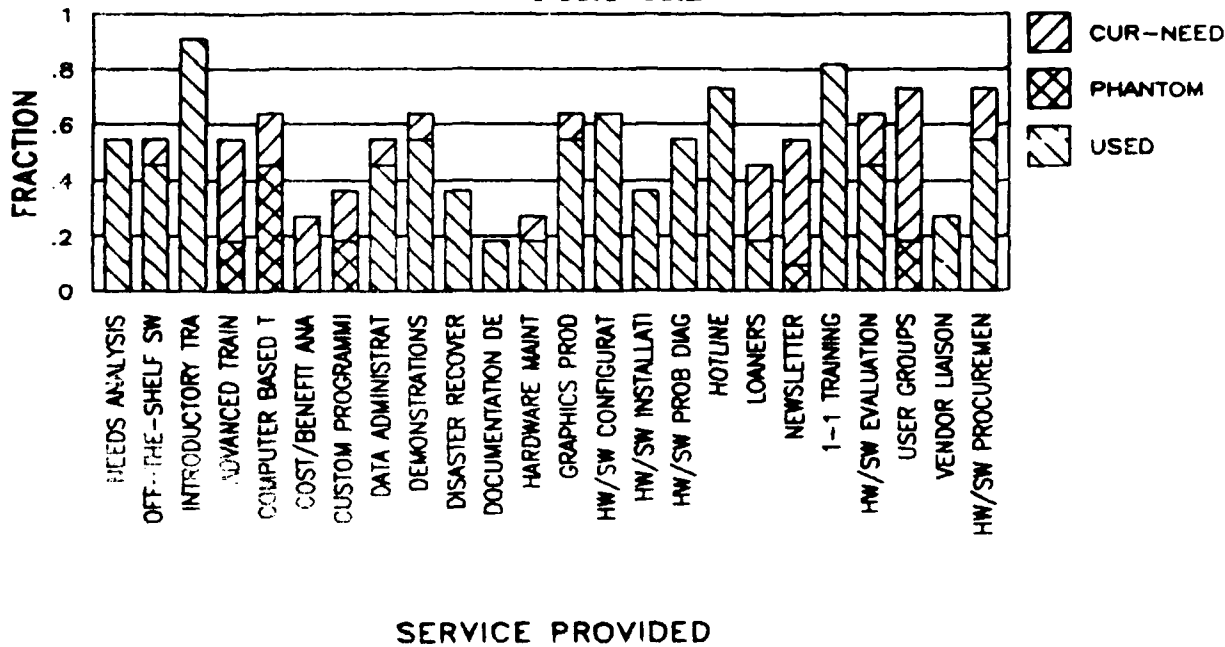
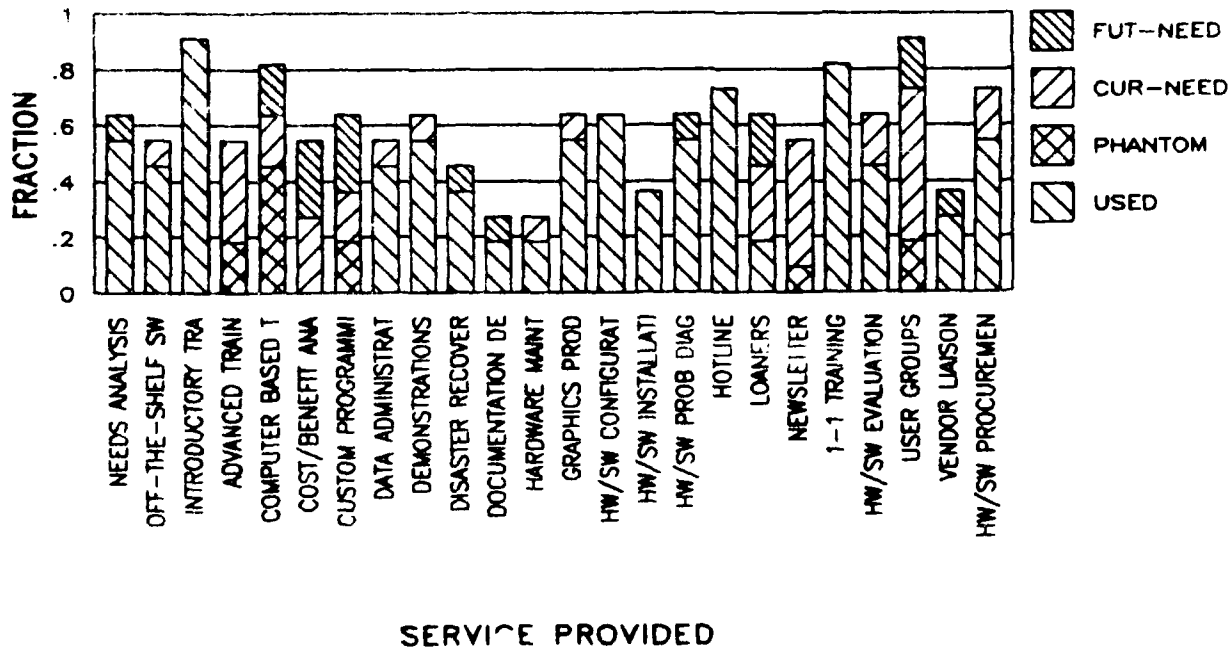


FIGURE H-8 FUTURE REQUIREMENTS
FORT ORD



HARDWARE CATEGORY	PERCENT REPORTED
MEMORY	18
HARD DISC	55
LARGER HARD DISC	27
MORE CONVENIENT BACKUP	45
BETTER MONITOR	18
MODEM	27
PLOTTER	
PRINTER	55
SOFTWARE CATEGORY	
MICRO-MAINFRAME LINK	27
SOFTWARE INTERFACE	27
REPORT GENERATOR	64
STATISTICAL PACKAGES	36
DECISION SUPPORT SYSTEM	45
WINDOWS	36
MICRO NETWORK	45

FIGURE H-9 HARDWARE/SOFTWARE LIMITATIONS

CATEGORY	PERCENT
1. PROGRAMMING	73
2. NEW OFFERINGS	91
3. HARDWARE	64
4. SOFTWARE	91
5. MAIN FRAME	82

FIGURE H-10 KNOWLEDGE

CATEGORY	MICRO COMPUTERS					TOTAL
	DAILY	BIWEEKLY	WEEKLY	MONTHLY	LESS	
ELECTRONIC MAIL	18			18		36
WORD PROCESSING	55	9	9	9		91
DATA BASE	55	18				82
SPREADSHEET	45			9		64
MODELING	9	9				18
STATISTICS	45		18			64
TUTORIALS		9	9	27	27	72
DATA COMMUNICATIONS	18		9			27
GRAPHICS	9	18	27	9		72
MAIN FRAME						
ELECTRONIC MAIL	9					9
WORD PROCESSING						
DATA BASE						
SPREADSHEET						
MODELING						
STATISTICS						
TUTORIALS						
DATA COMMUNICATIONS						
GRAPHICS						

FIGURE H-11 GENERIC SOFTWARE USE

SOURCE	ADVICE SCALES		
	ACCURACY	UNDERSTANDING	TIMELINESS
IC	1.5	1.2	1.5
USER GROUPS	3.8	3.5	4.5
FRIENDS	4.5	4.7	4.0
CO-WORKER	5.1	4.6	4.5
MANUALS	2.1	2.7	1.9
MAGAZINES	5.8	6.2	6.0
STORES	4.8	4.2	5.0
OTHERS	3.4	3.5	2.6
SUPERVISOR	5.4	5.3	6.6
	ASSISTANCE SCALES		
	PROCEDURAL	HW/SW	MICRO USE
IC	46	55	64
MANUALS	27	9	
CO-WORKER	9		
STORE	9	9	
OTHER	9		18
ALT MANUAL		27	

FIGURE H-12 MICRO COMPUTER ADVICE

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