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TECHNICAL REPORT NO. 21

SJIS STATE JUDICIAL INFORMATION SYSTEM FINAL REPORT (PHASE III)

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VOLUME 1 SJIS Documentation

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SEARCH GRUUP Inc.

National Consortium for Justice Information and Statistics

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TECHNICAL REPORT NO. 21 APRIL 1978

SJIS STATE JUDICIAL INFORMATION SYSTEM FINAL REPORT (PHASE III)

VOLUME 1 SJIS DOCUMENTATION

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ACQUISITIONS

Report of work performed under Law Enforcement Assistance Administration Grant No. 76SS-99-6049

SEARCH GRUUP Inc.

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The State Judicial Information System (SJIS) Phase III Final Report is presented in three volumes. Volumes I and II document the activities of the project. Volume III contains the proceedings of the National Judicial Data Utilization Workshop. SJIS Phase III, a project of SEARCH Group, Inc., (SGI) was funded through a grant from the Law Enforcement Assistance Administration (LEAA), U.S. Department of Justice. The three volumes of the SJIS Final Report are:

Volume I.

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SJIS Documentation. This report discusses the importance of system documentation, and examines "Guidelines for Documentation of Computer Programs and Automated Data Systems; Federal Information Processing Standards Publication 38" as a documentation standard for an SJIS. It presents the experiences acquired during the documentation of three existing state judicial information systems and makes recommendations for minimum documentation for an SЛS.

Volume II.

Topics in Judicial Data Utilization. This report documents research into the use of data reported to state court administration by trial courts; it presents a statistic for the validation of data for accuracy, completeness and consistency, a statistic for monitoring workload and estimating service time, techniques for the analysis of delay and a method of presenting data for ease of comprehension.

Volume III.

Proceedings of the National Judicial Data Utilization workshop. This report is a transcription of the panel discussions and presentations heard at the workshop covering the following topic areas: • Data Validation;

- Data Validation;
 Data Based Monitoring;
 Data Collection: Problems and Payoffs;
 State of the Art of Judicial Statistics;
 The Investigation of Delay;
 Weighted Caseload;
 Sentence Disparity Studies;
 The Infancy of Forecasting;
 Statistical Analysis and Dissemination.

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FOREWORD

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The work reported in this document was supported by a grant awarded to SEARCH GROUP, Inc., a consortium of the fifty states and the territories organized as a non-profit corporation to apply technology to the justice system. The SJIS grant was awarded by the Law Enforcement Assistance Administration of the U.S. Department of Justice. The missions of the project were to provide state-level judicial administration with tools for the effective utilization of data reported by trial courts; to select state judicial information systems and conform their documentation to requirements established by the committee; to assist state judicial information system projects through the committee review of participating states' SJIS grants; to continue the assessment of the SJIS participating states and facilitate a fruitful exchange of information about system development among the participants. This final report presents the findings of the Project Team. Larry Polansky served as Chairman of the SJIS Project Committee and Arthur J. Simpson, Jr. served as Vice Chairman. Phillip B. Winberry chaired the subcommittee charged with oversight of the assessments and review of the participating states' grant applications. James M. Parkison chaired the subcommittee responsible for documenting three state judicial information systems and developing recommendations for SJIS documentation. Loren Hicks chaired the subcommittee responsible for data utilization workshop.

PREFACE

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SJIS PHASE III PROJECT COMMITTEE AND STAFF

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The production of this document marks the end of SGI involvement with the SJIS Project. The management and staff of SGI gratefully acknowledge the diligent efforts of each project committee member and others involved throughout the life of the project and, in particular, those who took part in Phase III. It is virtually impossible to list everyone who contributed their time and effort to make Phase III of the SJIS Project a success. So, what follows is a partial list of individuals that were instrumental in the execution of this phase of the project. Since the work of Phase III consisted of three independent areas of activity, our acknowledgements follow the same pattern.

SJIS SYSTEM DOCUMENTATION

Several of those who were extremely helpful in providing insights into the development and use of the FIPS PUB 38, were Harry White and Bea Marron of the National Bureau of Standards, Tom Kurihara of the Department of Agriculture, Helen McEwan of the Federal Software Exchange Center, Jim Maxwell from the Department of Housing and Urban Development, and Alan Anderson from the Bureau of Labor Statistics.

The unflagging efforts of the staffs from the three states whose systems were documented are particularly appreciated. Their assistance went well beyond the call of duty. Thank-yous are extended to George Sisco and his staff in Missouri, Kathy Shelander and her staff in Florida. and Jim Martin and his staff in Louisiana.

Our thanks to Jim Parkison, Chairman, and the members of the System Documentation Subcommittee for meeting independently on several occasions so that the effort could go forward on schedule.

DATA UTILIZATION

Several who assisted in selecting states to provide data

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for our research were Lynn Jensen of the National Center for State Courts; Judge Arthur Simpson, Acting Administrator of the New Jersey Courts; Bill Bohn, State Court Administrator of North Dakota; Carl Bianchi, State Court Administrator of Idaho; Harry Lawson, then State Court Administrator of Colorado; and Mike Nieberding, Assistant Adminstrator for Information Systems, Administrative Offices of the Maryland Courts.

Without the contribution of 21 reels of computer tape containing raw courts data for several years, no research, workshop or final report would have been possible, and for this, we sincerely thank Bill Bohn, Harry Lawson and their respective staffs.

All of those who appeared on the National Judicial Data Utilization Workshop program have our gratitude.

To Loren Hicks, Chairman, and the members of the Data Utilization Subcommittee, our appreciation for your insights, guidance and diligence.

GRANTS REVIEW AND ASSESSMENT

Chairman Phil Winberry and his subcommittee have had the most thankless task since the project's inception. Since the project began, they have reviewed at least one state judicial information system grant from each of the states currently actively participating in SJIS development. They have read hundreds of pages of grant narrative, examined about 30 grant budgets, questioned schedules and generally tried to assist states to structure projects that are worthwhile and can be accomplished. They performed their work often under difficult circumstances and always under pressure. To this subcommittee, our most heartfelt thanks.

Finally, our thanks to Chairman Larry Polansky, whose leadership resulted in an extremely successful Phase III.

PURPOSE OF THE REPORT

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The State Judicial Information System documentation effort is one of three components of Phase III of the State Judicial Information System (SJIS) Project. The purpose of the effort was to develop software documentation guidelines which would adequately support the effective management of state judicial information system ADP resources and facilitate the transfer of developed SJIS(s), or selected components, to other jurisdictions. It is an important effort, for court-related management functions increasingly are becoming automated. It is a natural followup to earlier SJIS phases, which provided court administrators with guides to system development, implementation and evaluation, and presented a model SJIS including nontechnical discussions of hardware and software.

DOCUMENTATION APPROACH

From its inception, the intent of this documentation activity has been to develop guidelines for system documentation that would record the results of all state activities associated with the planning, design, development, and implementation of SJIS computer programs and automated data systems. A documentation package resulting from a state's utilization of the guidelines would serve to:

- Provide court administration with technical information to review at the significant development milestones, to determine that requirements have been met and that resources should continue to be expended.
- Provide court ADP support staff with technical information to allow later modification of SJIS software.
- Facilitate understanding among court administrative personnel, SJIS developers, programmers and operators, and using courts by providing information about maintenance, training, changes, and operation of the SJIS software.
- Inform other potential jurisdictions of the functions and capabilities of the SJIS software, so that they can determine if it will serve their needs.

DOCUMENTATION PROJECT METHODOLOGY

The SJIS documentation effort was divided into several tasks. The remainder of this section of the report describes those activities.

Selection of Preliminary System Documentation Guideline

A number of publications and guidelines were reviewed for preparing information systems documentation. Of those available, the most promising publication was one developed by the National Bureau of Standards entitled, Guidelines for Documentation of Computer Programs and Automated Data Systems. This publication, referred to in the remainder of this report as "FIPS PUB 38" (Federal Information Processing Standards Publication 38), was found to be a technically sound document presented in an easy to read format. These guidelines are general enough to be applicable to any ADP environment, yet specific enough to

I. INTRODUCTION

insure uniformity from system to system. Two additional factors in FIPS PUB 38's favor were its close similarity to the documentation requirements suggested in the SJIS Phase II Report, and the recommendation by the Law Enforcement Assistance Administration (LEAA) that FIPS PUB 38 be used as a standard when documenting systems developed with their funding. FIPS PUB 38 was reviewed in detail in terms of its applicability to SJIS needs, and tentatively was accepted as a guideline for SJIS documentation.

Selection of SJIS Candidates for Documentation

Having selected a documentation guideline, the second major activity focused on identifying those states, participating in the SJIS program, whose systems were sufficiently developed that they might serve as an appropriate documentation test for the guidelines. Because of the early state of development of the SJIS projects within the 23 participating states, it was impossible to recommend documentation of a complete SJIS, which, according to the SJIS Phase II findings, should include the following seven modnles.

- appellate court, criminal module;
- appellate court, civil module;
- general jurisdiction trial court, criminal module;
- general jurisdiction trial court, civil module;
- juvenile module;
- personnel module, and
- financial module.

Several states had, however, placed into operation one or more of the SJIS modules. Thus, for the purpose of selecting state SJIS(s) for documentation, each module was considered separately.

Four criteria were developed for selecting candidate modules for documentation:

- · The candidate module had to be one of the seven modules comprising an SJIS.
- · Consistent with the time frame of the project, the module must have been operational by at least February, 1977, and its design must have been stabilized before August, 1977.
- · The cognizant management personnel must have undertaken some kind of formal documentation procedure for documenting their candidate SJIS module.
- The jurisdiction in which the module was operational had to agree to participate.

Questionnaires were developed and distributed to the management of SJIS participating states. These questionnaires elicited information to determine which, if any, of the iurisdictions met the four selection criteria. Based on the responses received to the questionnaires, seven modules in four states were found to meet the criteria and were selected as candidates for documentation. The four states were Missouri, Louisiana, Florida and Georgia; and the seven operating modules covered five of the SJIS functional requirements: appellate court, criminal; appellate court, civil; general jurisdiction trial court, criminal; general jurisdiction trial court, civil; and juvenile court.

Development of the Documentation Project Study Design

The Documentation Project Study Design as developed consisted of two phases. The first phase required a review of the documentation generated by the state staff, to assess its utility vis-a-vis FIPS PUB 38, and to develop an estimate of effort and costs required to complete an optimum documentation package which would meet the objectives of the SJIS program. The second phase involved the actual documentation of those modules suitable for replication.

On-Site Reviews

Three major assumptions were made in respect to the overall project objectives, and more specifically, the onsite reviews.

- It was assumed that a reasonable amount of system documentation existed for each candidate module to be documented, and that every effort would be made to determine exactly what was adequately documented, to assure progress from that point.
- While FIPS PUB 38 was to be utilized in documenting the selected modules, it was not to limit the preparation of other documentation considered necessary to the successful transfer of the selected modules.
- If the study proposed documentation guidelines of direct relevance to the state SJIS projects rather than recommending existing guidelines, the project would be more useful.

Based on these assumptions, overall strategy in respect to the on-site review phase included the following steps:

- To determine what was already available in the form of SJIS module documentation.
- To meet with staff from each of the participating states for the purposes of identifying available materials, obtaining a detailed understanding of the selected modules, and obtaining answers to questions concerning system capabilities, features, constraints, and requirements.
- To develop a listing of whatever significant information was available about the selected modules and to com-

pare it to the information required to prepare system documentation in accordance with FIPS PUB 38.

- To estimate the length of time, effort and costs associated with the documentation of each candidate module, and to determine the value of each module in terms of its potential replication in other jurisdictions.
- To prepare a summary report that outlined the findings associated with the Phase I tasks.

System Documentation

Following acceptance of the Phase I summary report by the SJIS Project Committee, the system documentation phase of the study was initiated. This phase included the preparation of documentation for the General Jurisdiction Trial Court (civil and criminal) and Appellate (civil and criminal) Module in Missouri; the Appellate (civil) Module in Louisiana; and the General Jurisdiction Trial Court (criminal) in Florida. While Georgia was selected as a candidate state for documentation and had an operational module, that module was not documented in this phase, as the Georgia project was phasing out due to the unavailability of new funding. Also during this phase, the relevance of FIPS PUB 38 as documentation guidelines for the preparation of SJIS System documentation was determined.

REPORT CONTENT

Section 2 records the study team's findings regarding the value of documentation for judicial information systems developmental efforts, and the manner in which it is produced. Section 3 describes the relevance of the National Bureau of Standard's Guidelines for Documentation of Computer Programs and Automated Data Systems to the SJIS. Section 4 highlights the experiences of the study team in utilizing FIPS PUB 38 as documentation guidelines in three pilot SJIS states. Section 5 presents the study team's conclusions concerning the documentation requirements of the SJIS projects. Finally, the Appendix provides content guidelines for nine document types which the study team's analyses deemed the most appropriate to prepare, from both a staff workload and cost viewpoint, during local State Judicial Information System developmental activities.

2. IMPORTANCE OF SYSTEM DOCUMENTATION

OVERVIEW

Documentation is essential to the effective development, implementation, modification, operation, utilization, and potential transfer of any information system - whether manual or automated. Despite its importance it has been a notoriously weak area in the ADP industry - and one in which there are few industry-wide standards or guidelines. While there have been numerous books published on programming and documentation techniques, no single approach to documentation has been accepted for widespread usage. Additionally, funding constraints, tight scheduling and general programmer distaste for writing have generally relegated program documentation to the lowest priority. The courts have been no exception to this. In court management, system documentation is extremely critical. It is essential that the public records generated by the judicial process be properly stored and that ADP systems operationalized to support that process be adequately documented. The remainder of this section records the study team's analysis regarding the value of documentation for judicial information systems, and the manner in which it is produced.

THE PURPOSE OF DOCUMENTATION

A variety of court personnel need SJIS documentation. Court administrators and judges need some type of documentation when monitoring and controlling system development and operations. Systems analysts require documentation to plan new modules of the system. Programmers need documentation when writing instructions to implement the analysts' plans. Auditors need documentation in evaluating system reliability and in advising both court administrators and funding agencies of possible system shortcomings. These individuals generally need four types of documentation: user documentation; operating system documentation; program documentation; and operations documentation.

User Documentation

It is well known that most data processing systems require substantial amounts of money, manpower, equipment and time to develop. However, it is often forgotten that they are developed for user departments or organizations. There are many levels of users of an SJIS, each with differing information needs - from judges and court administrators, through court clerks, to the computer operator. For an SJIS to be used productively, instructions and aids to understanding its purpose and utility must be provided by system documentation for all levels of intended users.

For the purpose of an SJIS, the users for whom the "Users' Manual" is prepared are generally the Clerks of the participating courts. Consequently, the major focus of user documentation for an SJIS is to provide a general overview of the system, including the relationship of the courts to the SJIS; very specific instructions for entering case information into the system; and a detailed discussion of the reports that the system will produce. The user documentation must

also provide precise descriptions of the procedures to follow in identifying and correcting errors.

Unfortunately, however, in many SJIS's (and other data processing applications), input documents are considered to be self-explanatory, as are the reports generated by the system. To correct errors, either an error code is issued, or it is left up to the user to figure out his own mistake.

Adequate documentation should include input-layouts and completion instructions that would enable the user to complete specified documents for input to the system. The output report definitions and explanations contained in the same package would give the user the basis for understanding and interpreting the output. Should a problem develop with the input, the error correction procedures (also included in the package) would provide the user the means for making corrections. For effective utilization of any system, the user must understand the purpose of the system, how the system works (functionally), and what the system's capabilities are. The user must understand how the capabilities can be most effectively utilized.

System Documentation

In most data processing installations, system documentation ranks as the lowest priority in the already low priority that documentation holds. The primary reason for the existence of system documentation is that it specifies for the analysts and programmers the requirements, the operating environment, the design characteristics and the program specifications for the system. When it does not exist, much unnecessary work and wasted time may result, and many changes must be made due to poor communication and inadequate understanding of the requirements which the system must fulfill.

The problems arising from inadequate system documentation magnify thems-lves as the system development progresses. Each step in the growth of a system is dependent upon the accuracy and effectiveness of the work and documentation of the preceding steps.

Essential to the development of an efficient and effective system are concrete and well-defined job objectives and specifications. The system analyst cannot supply the programming staff with a workable detailed design if the objectives that the system is designed to achieve have not been defined. When changes, modifications, or maintenances become necessary, the systems analysts (designers) and/or programmers must rely upon their experience with the system, or piece together fragmented program documentation, unless sytem documentation is available. This makes the job of the analyst/programmers not only difficult, but expensive - as it requires substantially more time and work on their parts to understand the current system — in order to apply changes. System documentation is critical for assessing the effectiveness of the system after it has been implemented, for it is the only valid means of comparison between the user specifications and the end results Without it, the responsible staff for the assessment must rely upon the "best recollections" of individuals involved in the design, provided they are still available to query. Systems documentation is important because it saves both time and money.

Program Documentation

Equally important to both the maintenance and the operations staff is program documentation. Program documentation provides the maintenance programmers with the knowledge essential for effective debugging and implementation of enhancements and modifications. Due to fairly rapid personnel turnover in many SJIS's, the person maintaining a program is not the author; therefore, enhancement or modification of the program becomes a difficult task. Because the typical SJIS is subject to relatively frequent change due to new legislation or court rulings, it is essential that the documentation permit this dynamic situation to be addressed consistently and effectively. Care must also be taken to ensure that changes made to the system are adequately documented as they occur, for the temptation is strong to view documentation as static, rather than fluid, to be updated as the system evolves.

Without adequate program documentation, it is still possible to make changes in the system as required. However, complete program documentation is far less costly in manhours than having maintenance programmers wade through source code to obtain the understanding of the program they need to update the system.

Operations Documentation

Operations documentation provides to the personnel responsible for actually operating the computer on which the SJIS is operated, the specifications and requirements essential to planning hardware/software needs. It addressed hardware/software utilization, scheduling requirements and input/outpput handling processes. It also defines system recovery and restart procedures and outlines system error correction practice. In short, the operations documentation describes the software and its operational environment so that the software can be run. At the current stage of development of many SJIS's, the system analysts also serve not only as the programmers, but as operations personnel as well. Under these circumstances it may not seem necessary to have detailed operations documentation. It is likely, however, that the functions will become increasingly specialized as the courts make greater use of the capabilities of their systems personnel. Operations documentation then becomes essential at a time when many additional demands are likely to be placed on the system analysts who are most capable of producing the required documentation. To ensure that court operations are not jeopardized, operations documentation must be prepared as the system develops even though it may seem unnecessary at the time.

Summary

In summary, complete documentation of an SJIS provides for:

- the greatest and most efficient utilization of the system by the user;
- careful, well-planned design and integraton of the system:
- the knowledge essential for effective debugging and implementation of enhancements and modifications by maintenance programmers;
- the specifications and requirements essential to plan-

ning hardware/software needs and scheduling computer utilization by operations personnel.

In addition, complete SJIS documentation provides for the transferring of an SJIS information system from one judicial setting to another. Without adequate documentation the likelihood of such cost effective sharing is prohibited. The recently established Criminal Justice Information System Transfer Project, the National Clearinghouse for Criminal Justice Information Systems and the Federal Software Exchange Center of the General Services Administration, potentially provide for the sharing of computer programs developed by one SJIS project for use by another SJIS state. While there are many differences in the operating structures of the courts between states, information needs are fairly consistent. Thus, it may be possible to share SJIS developmental costs through this transfer approach. If this is to be possible, documentation of programs and systems must be adequate to enable the secondary user to understand the program capabilities, peculiarities, and limits, in order to determine whether the program meets the needs stipulated. The secondary user would also need good documentation to understand how to run the programs, and how to make any necessary modifications required locally.

DOCUMENTATION COSTS

In attempting to put a price tag on the cost of documentation preparation, one must first consider what it would cost a court administrator's office if no documentation were prepared. Documentation provides the means for careful, well-planned design, integration, implementation, modification and use of the system. Without it, the system would be less effective, as thus would be judicial administration. While a specific cost cannot be placed on these items, these issues must be given serious consideration in the court environment.

Incurring Documentation Costs

Documentation costs are incurred not only at the beginning of a project, but throughout its development. For example, it is difficult to conceive of a court administrator's office beginning to implement an SJIS without having given some thought to the kinds of information needed by the judiciary, court clerks, or court administrators for effective caseflow management and other judicial administrative needs. If the system is to be implemented effectively, it is essential that these requirements be spelled out and considered in conjunction with constraints on the system.

While this process may involve substantial costs, costs are also incurred as specific programs are developed to meet specified needs and, more importantly, as they are modified in response to changing conditions. Additional documentation costs are incurred in the course of preparing specific instructions for the Clerks of Court who are responsible for inputting the data on which the system is based. These are natural activities, which are essential to the effective implementation of an SJIS, whether or not they are thought of as "documentation".

In short, just as the costs of developing an SJIS must be considered collectively over a period of time, so must the costs of documentation. Thus, viewed from this perspective, the costs of documentation are not as exorbitant as they might appear if they are not amortized over the entire period.

Estimating Documentation Costs

In looking for help to estimate documentation costs, the study team was surprised to find that while the cost of documentation was of major concern, little had been done to develop a technique for estimating it. To address the problem of cost, most had established criteria for the amount of documentation to prepare, and were maintaining records of the actual costs to accomplish those requirements. Although an historical base will exist eventually to provide data to develop estimates, it does not exist now. In determing costs, the general rule-of-thumb used by many systems organizations is that 15 to 30% must be added to the cost of a project for documentation of a system similar in size and complexity to most SJIS's. This estimate takes into consideration the fact that the documentation developed will serve as the mechanism by which the project will be reviewed at each stage and phase of application

development.

Types of Documentation Costs

There are only two basic types of costs: staff and report production. Staff costs represent systems analyst and programmer time to record the results of the design, development and implementation phases of the project. Staff costs also include the time needed to prepare the User and Operations Manuals.

Report production costs include clerical and graphic arts personnel, reproduction and printing charges, and consultation fees. Occasionally, there may be other miscellaneous costs, but the major cost items are the two described here.

DOCUMENTATION WITHIN THE SJIS LIFE CYCLE

The Software Life Cycle

Computer programs and automated data systems evolve through phases from the time that an information need is identified, through the time that software produces the required output, and on through various modifications as the system evolves to meet changing conditions. It is recognized that there are in current usage many different terminologies to identify these phases and the stages within these phases. For our purposes, we have selected the National Bureau of Standards concept for describing the software system life cycle. Their concept states that there are three phases to the software life cycle. They are:

Initiation. During the Initiation Phase, the objectives and general definition of the requirements for the software are established. Feasibility studies, cost-benefit analyses, and the documentation prepared within this phase, are determined by agency procedures and practices

Development. During the Development Phase, the requirements for the software are determined and the software is then defined, specified, programmed, and tested. Documentation is prepared within this phase to provide an adequate record of the technical information developed.

Operation. During the Operation Phase, the software is maintained, evaluated, and modified as changes or additional requirements are identified.

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Within the development phase, which FIPS PUB 38 addresses, the National Bureau of Standards identifies four stages. While the terminology used to describe these stages

may be arbitrary, it provides a logical and convenient framework within which the development of the document types may be discussed. The Bureau's concept recognizes that not all of the document types are required to document software in every case and that in some cases the various document types may need to be combined. With this as a preface, the four development stages of the Bureau's software life cycle are:

Definition. During the Definition Stage, the requirements for the software and documentation are determined. The Functional Requirements Document and the Data Requirements Document may be prepared.

Design: During the Design Stage, the design alternatives, specific requirements, and functions to be performed are analyzed, and a design is specified. Documents that may be prepared include the System/ Subsystem Specification, Program Specification and Data Specification. The Test Plan is initiated during this stage.

Programming. During the Programming Stage, the software is coded and debugged. Documents that may be prepared during this stage include the Users' Manual, Operations Manual, and Program Maintenance Manual. The Test Plan is finalized during this stage.

Test. During the Test Stage, the software is tested and related documentation is reviewed. The software and documentation are evaluated in terms of readiness for implementation. The Test Analysis Report is then prepared.

Documentation Types

Until only recently, the National Bureau of Standards' guidelines for documentation of computer programs and automated data systems focused mainly on the Development Phase of the software life cycle and identified a series of ten documents generally prepared during this phase. (FIPS PUB 38) Now, through the efforts of another Bureau task force - FIPS Task Group 14, Documentation for Information Processing Systems — those guidelines are being expanded to address the document types normally associated with the Initiation Phase. Starting with those efforts, and then adding the experiences and backgrounds of numerous professionals, systems organizations, and the study team, the following list of document types was prepared. This list contains the titles and purposes of those document types most often generated during the various phases of the software life cycle.

Initiation Phase

Management Requirements Statement. The purpose of the management statement is to show what and how much is to be done, and why. This may also be referred to as a "concept statement" or a "requirements specification". By whatever title, this document is prepared generally by non-ADP personnel to describe the need in a specified area.

Project Request Document. The purpose of the Project Request Document is to provide a means for an organization to request the development/procurement/ modification of software or other system ADP-related services. It serves as the initiating document in the formal software life cycle, and provides a basis for communication with requesting organization to further analyze requirements and assess impact.

Feasibility Study Document. The purpose of the Feasibility Study Document is to provide a preliminary analysis to determine if there is sufficient expectation of achieving the desired results to warrant the investment of resources required to develop a proposed new or revised software system.

Cost/Benefit Analysis Document. The purpose of the Cost/Benefit Analysis Document is to provide managers, users, designers, and auditors with adequate cost and benefit information to analyze and evaluate alternative proposed systems.

Project Plan. The purpose of the Project Plan is to provide the formal schedules for showing activities which will be done. When they will be done, what resources will be required to do them, and what milestones will show that they have been done.

Development Phase

Functional Requirements Document. The purpose of the Functional Requirements Document is to provide a basis for the mutual understanding between users and designers of the initial definition of the software, including the requirements, operating environment, and development plan.

Data Requirements Document. The purpose of the Data Requirements Document is to provide, during the definition stage of software development, a data description and technical information about data collection requirements.

System/Subsystem Specification. The purpose of the System/Subsystem Specification is to specify for analysts and programmers the requirements, operating environment, and design characteristics for a system or subsystem.

Program Specification. The purpose of the Program Specification is to specify for programmers the requirements, operating environment, and design characteristics of a computer program.

Data Specification. The purpose of these specifications is to specify the identification, logical characteristics, and physical characteristics of data of a particular file/data base.

Users Manual. The purpose of the Users Manual is to describe the functions performed by the software in non-ADP terminology, so that the user organization (court clerks) can determine its applicability and when and how to use it. It should serve as a reference document for preparation of input data and parameters and for interpretation of results.

Operations Manual. The purpose of the Operations Manual is to provide computer operation personnel with a description of the software and of the operational environment so that the software can be run.

Program Maintenance Manual. The purpose of the Program Maintenance Manual is to provide the programmer in a maintenance environment with the information necessary to understand the program, the operating environment, and the maintenance procedures.

Test Plan. The purpose of the Test Plan is to provide a plan for the testing of software; detailed specifications, descriptions, and procedures for all tests; and test data reduction and evaluation criteria.

Test Analysis Report. The purpose of the Test Analysis Report is to document the test results and findings; present the demonstrated capabilities and deficiencies for review and provide a basis for preparing a statement of software readiness for implementation.

Operation Phase

System Audit Report. The purpose of the System Audit Report is to provide an assessment of the effectiveness with which objectives have been achieved and to analyze the actual cost and benefits compared with original projections.

DOCUMENTATION CONSIDERATIONS

Documentation preparation should be treated as a continuing effort, evolving from preliminary drafts, through changes and reviews, to the documentation and software delivered. The extent of documentation to be prepared describing the software is a function of agency management practices - in the case of the SJIS project efforts, the State Court Administrator's Office — and the size, complexity and risk of the project. To assist the court administrator in making that determination, the following documentation considerations are provided.

Responsibilities

In general there are various levels of responsibility for defining the documentation guidelines for an SJIS. The final responsibility for implementing the guidelines rests with the ADP manager for the court (e.g., Information System Division Director). It is the court administrator's initial responsibility to determine what documentation types are relevant, and the level of detail to which they must be prepared. However, since most court administrators are not technically trained in data processing, it is the responsibility of the SIIS Project Committee, and its technical support staff, to provide some general and flexible guidance to the court administrator regarding the extent and format of documentation that should be prepared for judicial information systems of different complexity.

Separate responsibilities inherent in the flexible nature of such guidelines should thus include:

- National general guidance to court administrators as to what documentation should be prepared under various conditions;
- · Determination by the court administrator of the documentation plan for a specific project, including;
 - What documentation types apply and must be prepared.
- The formality, extent, detail and format of the documentation.
- · Development by the Information System Division Director of the procedures for implementing the documentation plan, including:
- Individual responsibilities and a schedule of preparation for the documentation,
- Procedures and schedule of review, approval, and distribution and the distribution list.

Flexibility

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Flexibility in the use of the documentation guidelines should be provided by the basic organization of contents.

Format. The guidelines should be prepared using a consistent format

Sequencing of Contents. The order of the sections and paragraphs in a particular document type should be the same as shown in the documentation guidelines. Referencing of Documents. Handbooks, documentation procedures, etc., should be referenced rather than copying or repeating the information.

Section/Paragraph Titles. The titles of sections and paragraphs should be the same as shown in the documentation guidelines.

Expansion of Paragraphs. The document types have paragraphs with a general title and a list of factors that might be discussed within that paragraph. The intent of the documentation guidelines should not be that the resulting document has a discussion of each of these items, but that these items be considered in writing that paragraph..

Flowcharts/Decision Tables. The graphic representation of some problem solutions are treated best in the form of flowcharts, others in the form of decision tables. Either should be included or appended to the documents produced. (Usage of both is recommended.)

Combining and Expanding Document Types. When a system is extremely large or is to be documented in a modular fashion, a document could be prepared for each module. In some cases, the size of a document could necessitate that it be issued in multiple volumes to allow ease of use. In such cases, the document should be separated at a section division. Conversely, documents for small systems might be combined.

DOCUMENTATION CRITERIA

The formality, extent, and level of documentation to be prepared should be a function of the court administrator's management practices, and the size, complexity, and risk of a project. In general, as the size, complexity, and risk of a project increase, so does the need for formal, extensive, detailed documentation.

The following sections reflect one approach of establishing standards and criteria to determine documentation reguirement levels for a project. It is the court administrator's responsibility to establish and enforce guidelines as well as to change or deviate from guidelines as management judgement indicates.

Minimum Documentation Preparation

Minimum documentation is prepared, by most organizations, only when the computer program/system is to have a single use, or is of minimum complexity. When an SJIS project is confronted by this situation, no significant documentation cost should be added, but a summary document that shows what type of work was produced and what the program/system really does should be prepared. Documentation that results from the development of the system's

programs, (i.e., program abstract, compile listings, etc.) should be maintained on file for a reasonable period after the development of the program/system. Criteria for categorizing a program/system as a minimum documentation effort can be its expected usage, the level of control over its products, or the resources expended in its generation, in man-hours or dollars.

The summary document that is prepared may be handwritten, but it should define data requirements; should summarize the functions of the computer program(s); and should explain how the program is to be run.

Semi-Formal Documentation

Semi-formal documentation normally is prepared when the frequency of system processing is intermittent, nonstructured, or irregular. It is also prepared if the system is expected to be used only by people in the same system environment, and control over output products can be reasonably maintained. While this may be true of many SJIS efforts at present, it is not likely to continue to be the case as these systems evolve. This level of documentation, consequently, is inadequate for most SJISs. SJIS projects in this situation might prepare all basic elements of documentation in typewritten form, but not necessarily in a finished format suitable for publication. The documentation in this case functions as working papers. It should be remembered that a decision to remain at this level may require duplication of effort later as the system expands and more formal documentation is required.

The semi-formal documentation which should be prepared includes a management summary; data, system and program specifications; user's and operations manuals; and a test plan.

Formal Documentation

Formal documentation, by consensus, is prepared when systems are on-going; when their processing is critical to their organization; or when their products have potential external distribution. In these situations, an SJIS should be documented in a formal, rigorous manner, with an in-depth review conducted by the court adminstrator. Most, if not all, of the SJIS projects would require this level of documentation.

The format of this documentation can follow that outlined in any of a number of possible guidelines. For discussion purposes the guidelines attached in the Appendix are referenced. These guidelines represent a condensed version of FIPS PUB 38 and also include the best features of the SJIS Guide to System Development and Implementation, the new FIPS Initiation Phase publication, as well as other documentation guidelines prepared for other agencies, notably the U.S. Department of Agriculture.

The documentation guidelines in the Appendix include a system management overview document; a feasibility study document; a project work plan; a functional requirements document; system and program specifications; user and operations manuals; and a test plan.

BACKGROUND

The Federal Information Processing Standards Publication (FIPS PUBS) Series of the National Bureau of Standards (NBS) is the official publication relating to standards adopted and promulgated under the provisions of Public Law 89-306 (Brooks Bill) and under Part 6 of Title 15, Code of Federal Regulations. Since enactment of these legislative and executive mandates, the NBS has had a leadership role in the management of activities within the Federal Government relating to the development and maintenance of uniform Federal automatic data processing guidelines. These activities have concentrated on:

- facilitating the interchange and sharing of data, programs, and equipment by Federal agencies; making the government and industry aware of the need for standards to achieve compatibility; enhancing the effective utilization of ADP products and services in preparation and delivery of public services:
- improving the performance and quality of ADP products and services developed by or acquired by government agencies.

In carrying out these activities, the NBS worked closely with the voluntary standards activities of the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO). The NBS is responsible for assuring Federal participation in the development of ANSI and ISO voluntary standards, for the consideration of adopting them as Federal standards when they meet the requirements of the Federal Government, and for initiating independent development actions when they do not. Basically, the NBS Federal Information Processing Standards program identifies those areas in which ADP standards are needed, pursues their development, and promulgates the completed standards or guidelines through the Federal Information Processing Standards Publication Series. Once published, these standards become mandatory for a large segment of the Federal ADP-community. Presently, there are more than a dozen active FIPS task groups, addressing such areas as programming languages, security and privacy, network protocols, and documentation. To date, over 40 standards, guidelines, and information documents have been developed and published by the NBS in the FIPS PUB series, including FIPS PUB 38. The current standards efforts address four major areas:

standards that provide for the effective interchange and sharing of data;

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- standards to increase the performance and assure quality control of ADP products and services; standards that facilitate the transfer and use of computer technology through effective man-machine interfaces: and
- standards to provide for the safety and security of personnel, equipment, and data.
- In June 1974, a letter from the Director of the National Bureau of Standards to the Director of the General Gov-

3. RELEVANCE OF FIPS PUB 38 TO SJIS

ernment Division of the General Accounting Office, cited documentation as one of the highest priority subjects in the Federal ADP Standards Program. This was followed, in October 1974, by a report from the Comptreller General of the United States to Congress, entitled Improvement Needed in Documenting Federal Computer Systems. That report noted that Government standards are not available to assist Federal managers in deciding what type of documentation to prepare, how much to prepare, and when and how to prepare it. Although good documentation does not insure successful computer operations, inadequate documentation can increase the cost of Federal operations, weaken management control of ADP systems, contribute to loss of funds and assets, and limit the potential for sharing programs.

In March 1973, FIPS Task Group 14, "Documentation for Information Processing Systems," was established and charged with developing standards and guidelines for the documentation of individual computer programs and automated data systems. Using available guidelines from various Federal, commercial, and academic organizations as points of departure, the group (composed of representatives from more than 20 federal agencies) selected the best features of the best of these, and made them generally applicable to Federal computer installations. Guidelines for Documentation of Computer Programs and Automated Data Systems, (FIPS PUB 38), was one of the products developed by this group.

These guidelines provide a basis for determining the content and extent of documentation for computer programs and automated data systems. They identify software development phases and related document types, and provide examples of documentation options and content guidelines for the following ten documentation types:

Functional Requirements Document Data Requirements Document System/Subsystem Specification Program Specification Data Base Specification Users Manual **Operations** Manual Program Maintenance Manual Test Plan Test Analysis Report

In their current form, the guidelines are intended to be a basic reference and checklist for general use throughout the Federal Government to plan and evaluate documentation practices. They are not intended to be used as rigorous documentation standards. Each agency must develop, from FIPS PUB 38, documentation standards appropriate for its unique environment.

CONTENT

As stated above FIPS PUB 38 contains guidelines for the content of software documentation and examples of how management might determine when and how to utilize the ten document types described. The publication is divided into three parts. Part I states the purpose of each document type and its relationship to the software life cycle which is described in an earlier section of this report.

Part 2 discusses some considerations in using FIPS PUB 38 documentation guidelines and includes examples of criteria, which an agency might use to determine the extent of documentation required. While the focus of Part 2 is on the utilization of the ten FIPS PUB 38 document types, the considerations outlined apply in the utilization of any set of document guidelines.

Part 3 presents the content guidelines for the ten document types. A capsule summary of the documents follows, with reference to a judicial environment. Functional Requirements Document

Describes the development group's (Information Systems Division) understanding of the user group's (Judges, Court Administrators, Court Clerks) requirements for an operational capability.

Written in user lanaguage, minimizing technical terminology about ADP hardware.

Contains an analysis of methods, impacts, cost requirements, and operating environment.

Data Requirements Document

Describes the development group's (Information Systems Division) requirements for data, and the user group's (Court Clerks) data collection effort to establish and maintain system files.

Written in user terminology.

Contains descriptions of input data, procedures and constraints in data handling, expected outputs, and specifications of data elements.

System/Subsystem Specification

Describes the system structure, function, and flow to analysts and programmers in the development group, at

a level of detail beyond the functional description. Written as a technical document, in enough detail to

carry out program design and coding. Contains performance requirements and design logic

for the system/subsystem.

Program Specification

Describes the program requirements to analysts and programmers in the development stage.

Written as a technical document, in enough detail beyond the system specifications to describe adequately the component functions, outputs and performance to permit program coding and testing.

Contains performance requirements, instructions for operations, data structures, and program logic. Data Base Specifications

Describes the attributes of data bases, and data elements contained therein, when several groups are involved in maintaining and using the same data base.

Written as a technical document, for use by programmers and by data base managers.

Contains detailed information to permit coding, data base generation, and maintenance.

User's Manual

Describes how the user group (Court Clerks, Court Administrators, etc.) will use the automated data systems and computer programs prepared by the development group.

Written in user terrminology.

Contains instructions and procedures for data entry, equipment operations, interactive queries, and sample outputs. Sections 1 and 2 are directed toward user management (Judges, Court Administrators). Sections 3 and 4 are directed to the users (Court Clerks). **Operations** Manual

Describes how the computer operations personnel

will initiate, run, and complete processing of the job. Written in operations terminology, and usually fol-

lows a step-by-step scenario.

Contains instructions and procedures for routine operations, recover (i.e., non-routine operations), and remote terminal operations, if they are required for data entry or remote batch operations.

Program Maintenance Manual

Describes the accepted, operational computer programs for the maintenance programmers, who are responsible for making changes to those programs. The design approach, program logic, related data, and operating characteristics are described.

Contains diagrams and listings of source code for the operational version of programs, and narrative explanations of interfaces, parameters, codes, and messages. Test Plan

Describes the test plan, testing procedures, test criteria, and evaluation criteria.

Written as a non-technical document for users and staff personnel conducting tests; and in appropriate technical terminology for analysis, programmers, and operations personnel

Contains test specifications and details concerning the step-by-step testing procedures.

Test Analysis Report

Describes the results of the test.

Written for management (Court Administrators), describing the test results for management decisions regarding the acceptability of the product. Results should be compared to the operational requirement and performance capabilities to assure that all design changes have been incorporated.

List of improvements which can be made in design or operation of the system as determined during the test period.

UTILITY AND PROBLEMS

Two groups are generally involved in developing automated data systems and computer programs: the *user group* and the *development group*. The user group specifies the requirements that the system must be designed to meet, provides the data inputs, and uses the outputs. The development group performs the design, programming and test functions. In the court environment, as perhaps in others, the lines between these groups are not always clear, but in general their composition is as follows: Users Group

State Supreme Court/Chief Justice

Judges of Appellate, General Jurisdiction and Family/Juvenile Courts

Court Administrators

Clerks of Court

If the system is designed to interface with other systems or serve more than the court management functions, additional users might include: (1) District Attorneys/States Attorneys (2) Private Attorneys/Public Defenders/Legal Aid

(3) Law Enforcement agencies

(4) Corrections agencies

Development Group

State Courts Adminstrator Information Systems Division Personnel in the Office

of State Courts Administrator (OSCA) Information Systems Division Personnel in other au-

OSCA/Supreme Court.

FIPS PUB 38 was developed to facilitate the interchange of information about computer software between and within these groups and to support the effective management of the ADP resources which will be required by their system.

Utility

The utility of these guidelines can be best understood by remembering that each document type proposed in FIPS PUB 38 is intended to be written for and used by a specified subset of these two groups. For example, the Functional Requirements Document is directed toward Judges and Courts Administrators, while the Operations Manual is directed toward computer center personnel. Therefore, a more detailed look at the interests and concerns of these groups is appropriate. First, in a judicial environment some combination of Judges, Administrators, Clerks, and systems personnel representing both of these groups must approve the decisions concerning the project, based on its contribution to the overall objectives of their organizations. Second, Judges and Administrators are concerned with improved efficiency and effectiveness, better information for decisions, training of staff, and internal procedures. Their function is to identify performance and acceptance criteria, review the development of the system, train user personnel, and use the developed system. Third, the State Courts Administrator and Information Systems Division Director (the management of the development group) are interested in the amount of change that must be anticipated, the completeness of user requirements, the complexity of the development effort, the mode of operation, the available resources, and the system life. Their function is to develop a set of technical specifications for the final product, from which program code can be prepared and tested. These specifications are the translation of the functional descritions that state user requirements. Fourth, the system developers are concerned with product performance, correct and complete specifications and completion of the project on time. Finally, the Court Clerks, as the primary users of the system, are concerned with furnishing data. changing procedures to fit the new system, and understanding how the new system will affect their everyday functions.

For the most part, the needs of these groups can be satisfied by the documentation which will result from using FIPS PUB 38 as documentation guidelines for the Development Phase of the software life cycle. Both the functions and needs of these groups are addressed by at least some part of FIPS PUB 38.

Problems

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Although FIPS PUB 38 does provide the correct types of

tomated courts under the administrative jurisdiction of

documentation, the groups in a judicial environment are not necessarily indentical to the "audiences" toward which the ten FIPS PUB 38 documents are directed. FIPS PUB 38 is intended to be applicable to a wide range of types of systems, including such very large, multi-site operations as those within the U.S. Department of Defense. The "audiences" that are encountered in a judicial environment are comparatively small and unspecialized, with personnel performing several tasks, such as design, programming, maintenance, and operations. There are usually not separate "development", "programming", and "maintenance" groups for whom specialized documentation is necessary, but in fact, most court information systems division personnel perform varying functions that are addressed by several FIPS PUB 38 documents. Thus, a rigid application of FIPS PUB 38 would be overly segmented, specialized and duplicative in the present judicial environment.

A related problem results from the use of consultants and subcontractors to perform many design and programming tasks in many SJIS's. Documentation such as the Functional Requirements Document and the System/Subsystem Specifications must be supplied to an independent consultant so that their function can be performed. Similarly, documentation such as the Programming Specifications and Program Maintenance Manual must be supplied to the SJIS by the consultant. FIPS PUB 38 does not explicitly address documentation by outside parties or suggest ways such documentation might be inserted into the overall system development and documentation package.

FIPS PUB 38 is designed to specify documentation for only the Development Phase of the software life cycle. Both the Initiation and Operations Phases are not addressed, but are to be covered by other FIPS PUB documents currently being prepared. Thus FIPS PUB 38 is not designed to be complete system documentation guidelines.

Documentation should be specified by its contents, as FIPS PUB 38 does, but also by the activities that generate it. These activities include system design, development, implementation and testing. FIPS PUB 38 addresses the products of these activities, but was not designed to prescribe standards and procedures for the conduct of the actual activities. What is required is a set of guidelines that formalize SJIS policy relating to ADP development and maintenance. These guidelines should prescribe standards and procedures (functional) for analysis, design and programming development, computer testing, management accountability and approval control, and *documentation require*ments for all computer systems developed under the LEAA-sponsored SJIS project.

Further, since the FIPS PUB "Operations Phase" documentation guidelines has not yet been developed, there is little available that addresses SJIS concerns pertaining to security and privacy. One FIPS PUB document now in the early stages of preparation will describe system audit requirements, focusing on the continuous rechecking of system performance and security. Another provides a guide to the dissemination of criminal history information. Both documents should be reviewed for application in the SJIS environment and should be used as input in future SJIS documentation efforts concerning security and privacy issues.

SUMMARY

Documentation is essential to the effective development,

implementation, modification, operation and utilization of any system. But while documentation is essential, few organizations will expend the resources required to develop it. To assist SJIS managers in deciding what type of documentation to prepare, how much to prepare, and when and how to prepare it, the FIP PUB 38 guidelines should be a useful tool. In addition to providing a basis for determining the content and extent of documentation for computer programs and automated data systems, the guidelines identify software development phases and related documentation

types.

They are an excellent reference source for judiciallyoriented organizations who recognize the importance of documentation but have neither guidelines nor the time to develop them. Because of their generalized nature there are a few problems associated with their utilization. However, the impact of the problems can be minimal if the potential user will thoroughly review them and adjust their use to the judicial environment.

OVERVIEW

To test the utility of FIPS PUB 38 as a documentation guideline for general use by the participating states, the SJIS System Documentation Project included a task which required the documentation of three states' SJIS project activities in accordance with this guideline. These three states were Florida, Louisiana, and Missouri. Due to the limiatations of the budget for this task, the study team was not required to provide all ten document types for each of the three selected states. Instead, they were asked to provide the following four FIPS PUB 38 documents for each of the states and the remaining six document types for only Missouri.

Basic Four Documents

- 1) Functional Requirements Document
- 2) Data Requirements Document
- 3) System/Subsystem Specification
- 4) Users' Manual

Remaining Six Documents

- 1) Program Specification
- 2) Data Base Specification
- 3) Operations Manual
- 4) Program Maintenance Manual
- 5) Test Plan
- 6) Test Analysis Report.

The following pages highlight the experiences of the study team in utilizing FIPS PUB 38 as a documentation guideline in these three states.

FLORIDA EXPERIENCE

The Florida SJIS presented an opportunity to learn a great deal about both the documentation of systems, as well as the process of transfer of systems. The programming for the Florida SJIS originated with an existing system, the Justice Information System (JUSTIS), which was operational in Milwaukee, Wisconsin. JUSTIS is an on-line version of the Prosecutor's Management Information System (PROMIS). This transfer was carried out by the delivery of a tape of JUSTIS, along with some associated written materials. Although PROMIS is an exemplary LEAA project, with comprehensive documentation available, most of this documentation was not directly applicable to this documenta-tion effort of the Florida SJIS.

- First of all, the available documentation for PROMIS is for a batch-oriented system, and the implementation of it in an online mode demands a substantial modification of the documentation.
- · Second, PROMIS was modified to become Milwaukee's version, and again further modified by Florida.
- Third, a significant amount of the documentation reguired by FIPS PUB 38 relates to project environmentspecific materials, such as the Functional Requirements Document, the User's Manual the Operation's Manual, and so forth.

4. STATE S.IIS DOCUMENTATION EXPERIENCES

· Fourth, the PROMIS materials are not formatted according to FIPS PUB 38, although sections of it could be transferred.

In total, the existing PROMIS documentation could not be considered as a basis for the documentation of the Florida SJIS, but independent documentation was necessary.

Although the programming for the Florida SJIS was transferred in with the assistance of Milwaukee, the written documentation was minimal. Moreover, since the Florida SJIS was being brought up on the Legislative Data Center (LDC) computer, the Florida SJIS staff had to rely upon the LDC staff for help in operationalizing the system. In those situations, the documentation of the LDC efforts was minimal. However, the staff of the Florida SJIS provided substantial time and labor to assist this documentation effort. and the four intended FIPS PUB 38 documents were constructed

The Florida experience suggests several considerations that are worthwhile. All personnel involved emphasized the necessity of good documentation if a system transfer is attempted. The study team found evidence to believe that difficulties arose in the JUSTIS transfer because of the limited documentation available of the on-line modifications of PROMIS. However, also important for the transfer process is the assistance of the organization from which the system is being transferred. Although opinions varied, the assistance of Milwaukee did aid the transfer, and more assistance could have further helped.

Consistency of documentation methods would be one factor which would aid the transfer process. FIPS PUB 38, or some other similar documentation guideline would thus be valuable. However, the point to be stressed is that regardless of the documentation technique, a comprehensive documentation effort that provides a complete system description is more valuable than an incomplete system description prepared in accordance with FIPS PUB 38 guidelines. Redoing existing documentation to comply with FIPS PUB 38 would not necessarily provide any advantages. The emphasis should be placed on the necessity of thorough documentation during the developmental phases, rather than the post facto documentation of presently implemented systems. Also, the process of systems transfer should be considered with the knowledge that the transfer process might be accompanied by assistance from the transferer; that other aspects of transfer technique should be applied, such as personal meetings; and delivery of "usable" items, such as a disk or tape of the software should be encouraged.

LOUISIANA EXPERIENCE

The Louisiana SJIS presented an appropriate complement to the documentation effort, since this system was limited in both complexity and scope. The Louisiana SJIS consists to two modules, one for the Appellate Court, and another for the Courts of general jurisdiction (civil, criminal, and juvenile). The Appellate module is a relatively small system, implemented on a WANG computer, and requires minimum operator and user interaction. One complicating factor arose because the programming of the system was performed by an independent consultant, rather than the SJIS staff.

In this situation, a rigid application of the FIPS PUB 38 ten-document-type guidelines would have been inefficient ---- the size of the system, and the limited number of personnel did not warrant the time and expense such documentation would require. Therefore, Louisiana was a good example of the flexibility feature of FIPS PUB 38 and demonstrated the importance of conducting a preliminary analysis of documentation needs on an individual system basis. Such an analysis would allow for a modification of the FIPS PUB 38 guidelines to suit the specific system developmental environment. The four document types that the study team did prepare represent a reasonable documentation effort for this system. The material prepared for each document was not overly redundate because while FIPS PUB 38 was followed the study team allowed some flexibility in the formating of the documentation. The documentation which was prepared is appropriate both in terms of providing sufficient data to utilize and operate the system and to assist in its potential transfer.

MISSOURI EXPERIENCE

The Missouri SJIS provided the study team with two unique opportunities. First Missouri's SJIS had two subsystems functioning at the statewide level, the General Jurisdiction and Appellate Subsystems. This allowed the study team to test the flexibility of the guidelines in both an integrated and multi-system environment. Second, it allowed them to acquire experience in documenting a system according to the full set of guidelines or document types.

There were a number of factors that affected the results of this documentation experience that deserve discussion. Many of the original developers of the existing software systems were no longer employed by the Missouri SJIS project. Therefore, historical and background data needed to complete those segments of the documentation requirements were unavailable. Also unavailable were data pertaining to the system test and its results. To the extent possible, project and study staff tried to recreate the test, but only partial documentation is available. Additionally, the developers of the system are also the maintenance and operations personnel. Thus, there was no perceived need to prepare any documentation directed solely to maintenance and operations activities. This occurred simply because the staff could function without them. This meant modifying the study team's schedule to produce this material. Finally, there was a problem of terminology. As one would expect, there were some differences in the project and study team's definitions of ADP terms. This required patience and suggested that FIPS PUB 38 could be interpreted differently by various users, unless some guidance was provided on

both sides.

The Missouri SJIS project documentation effort provided an opportunity to gain additional insight into the costs associated with the preparation of system documentation. Figure 1 depicts the costs incurred by both the project and study staffs in the preparation of the ten FIPS PUB 38 document types for the State of Missouri. It should be noted that these costs are minimized in that all the travel costs, professional fee, and the costs involved in the Phase One survey of the existing documentation are excluded for the purposes of this table. If an SJIS elects to have a contractor assist in the post-design preparation of documentation, similar costs must be added. The total documentation preparation cost of \$62,982 represents 16.7 percent of the project's total costs.

CONCLUSIONS

First, any SJIS state is encouraged to begin its system documentation during planning and design stages, not after it has been implemented and operationalized. Documentation preparation must be treated as a continuing effort, evolving from the time that an idea to create the software occurs, through the time that the software produces the required output. Most documentation, such as the test plan, is more easily constructed during the time the activities that should generate it, such as testing, actually occur. Documentation constructed after this period is usually more expensive, as well as less complete. Original personnel may have left the project, or the remaining personnel may be unable to remember. It is difficult to motivate systems and programming personnel to document systems which are already operating successfully.

Second, the guidelines, if rigidly followed, result in a significant amount of redundant information. In a judicial environment, where there are small staffs, and where the developers are also the maintenance and operations staff, this rigidity would not be cost-effective. In such an environment, the study team would recommend a flexible approach, permitting the combining of several document types to eliminate redundancy.

Third, the guidelines demonstrated their flexibility by giving the study staff the option to document in either a total system or modular fashion. This helps when the system is an extremely large system.

Last, the Missouri experience demonstrated that management must have a real commitment to producing documentation if adequate documentation is to be prepared. Rather than solely emphasizing system output — reports, etc., management must equally stress the production of documentation, which is also visually verifiable and indicative of project activities.

I. Functional Requirements Document Study Team* Missouri OSCA** Subtotal

II. Data Requirements Document Study Team Missouri OSCA Subtotal

III. System/Subsystem Specifications Study Team Missouri OSCA Subtotal

IV. Program Specifications Study Team Missouri OSCA Subtotal

V. Data Base Specification Study Team Missouri OSCA Subtotal

VI. Users Manual Study Team Missouri OSCA Subtotal

VII. Operations Manual Study Team Missouri OSCA Subtotal

VIII. Program Maintenance Manual Study Team Missouri OSCA

Subtotal

IX. Test Plan Study Team Missouri OSCA Subtotal

X. Test Analysis Report Study Team Missouri OSCA Subtotal

> TOTAL SWJIS Study Team Missouri OSCA TOTAL

costs of documenting other two state systems are excluded.

	Professional La	bor - Graphics	Clerical Labor	& Reproduction	Total
	Hours	Cost	Hours	Cost	Costs
1	75.3	\$ 1,944	75.8	\$ 840	\$ 2,784
	1,073.3	10,454	123.8	537	10,991
	1,148.6	12,398	199.6	1,377	13,775
	25.1	648	34.2	389	1,037
	359.4	3,500	41.5	180	3,680
	384.5	4,148	75.7	569	4,717
	62.8	1.620	57.9	643	2,263
	893.6	8,704	103.0	447	9,151
	956.4	10,324	160.9	1,090	11,414
	69.0	1,782	18.7	223	2,005
	983.4	9,574	113.5	492	10,066
	1,052,4	11,356	132.2	715	12,071
	27.6	713	7.8	114	827
	394.4	3,841	45.5	197	4,038
	422.0	4,554	53.3	311	4,865
	17.9	462	14.5	196	658
	254.6	2,480	29.4	128	2,608
	272.5	2,942	43.9	324	3,266
	19.6	506	5.3	68	574
	279.6	2,723	32.2	138	2,861
	299,2	3,229	37.5	206	3,435
	29.4	772	12.5	149	921
	419.3	4,067	48.4	210	4,277
	448.7	4,839	60.9	359	5,198
	9.8	253	7.6	88	341
	139.8	1,362	16.1	70	1,432
	149.6	1,615	23.7	158	1,773
	13.7	354	10.3	121	475
	194.7	1,896	22.5	97	1,993
	208.4	2,250	32.8	218	2,468
	275.1	9,054	244.6	2,831	11,885
	4,992.1	48,601	575.9	2,496	51,097
	5,267.2	\$57,655	820.5	\$5,327	\$62,982

Figure 1 Approximate Costs of Preparing Documentation of Missouri SJIS, by Volume

* Based on actual expenditures for labor and overhead directly attributable to documentation effort. Travel expenses, fee, Phase 1 expenses, and

** Based on total estimated time spent preparing exisitng documentation prior to this effort, plus the time spent working with the Study Team on this project. Allocated proportionately using the same percentage distribution as the Study Team effort required.

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INITIAL DOCUMENTATION CONSIDERATIONS

The State Judicial Information System Final Report (Phase II), presents a compilation of materials that are designed to assist the development of judicial information systems. Naturally, since systems documentation is a fundamental aspect of the developmental process, part of the "SJIS Guide to System Development and Implementation" recommends specific types of documentation that should be prepared. These documents are SJIS Project Plan - Describes project goals, activities and costs:

SJIS Information Requirements Analysis Document -Describes system input and output needs, and general system functions;

SJIS Functional Design Specification - Describes system performance attributes necessary to meet the preceding information requirements; SJIS Implementation Plan — Describes all specific activities necessary to implement the system; SJIS Detail Design Document - Provides technical details for system programming and operation,

Although these documents provide valuable information, other materials could be prepared and other documentation guidelines are possible. Importantly, the users' and operator's specialized needs are left unaddressed and undocumented. In a judicial environment, where there is limited technical knowledge, these documents are even more important.

As a result of these unmet documentation needs, the study team was charged to evaluate alternate documentation guidelines or methodologies, with greatest attention directed to the value of the National Bureau of Standards FIPS PUB 38".

Documentation Guidelines Comparisons

Although there are variations in the environments in which computer systems are being implemented, there are also major similarities. These similarities can be combined under a structure which can be characterized as a "Software Utilization Cycle" or "Software Life Cycle". This cycle, which has been discussed earlier, includes the evolutionary phases of system conception, through development and operation. Of course, these phases can also be further subdivided. (Figure 2).

Regardless of application, environment, scope, or budget, this cycle can be discribed for any system. Each phase, or sub-phase, can also be linked with types of information, or documents, that should be generated during that phase. However, the differences between systems will affect the scope or detail of the documents which are produced. Quoting from the introduction to FIPS PUB 38:

Documentation preparation should be treated as a continuing effort, evolving from preliminary drafts, through changes and reviews, to the documentation and software delivered. The extent of documentation to be prepared is a function of agency management practices and the size, complexity and risk of the project.

Considering the relationship between the software utili-

5. SJIS DOCUMENTATION REQUIREMENTS

zation cycle, system documentation needs, and the judicial environment, the following documentation "guidelines" were reviewed:

• FIPS PUB 38.

- U.S. Department of Agriculture, ADP Standards for Computer Systems,
- U.S. Army Regulation 18-1,
- U.S. Army Pacific Supplemental Guidelines,
- Philips Data Systems, Information Systems Handbook.
- Public Technology, Incorporated, System User's Documentation Guide.

as well as other corporate and computer industry generalized techniques, standards, or guidelines.

The previous "guidelines" were discussed with knowledgeable persons who had written them, worked with them by documenting systems, and understood the needs of governmental coordination.

Considerations of FIPS PUB 38

FIPS PUB 38 was written from the perspective that specifying outputs of a process (i.e., documents resulting from planning) was more effective than specifying the process alone (i.e., the planning activities). Cne reason given in support was that the tangible evidence of resulting documentation can be easily monitored and measured. Thus, the use FIPS PUB 38 might imply proper planning.

Although the study team somewhat agrees with this concept, there would be value in a combined planning/ documentation approach, which specifies both the planning activities and the documents.

However, the possible best use of FIPS PUB 38 must also be considered within the context of all of the FIPS PUB series of documents, which apply to the various aspects of systems planning and design, as structured by the "Soft-ware Utilization Cycle". Significantly, the new FIPS PUB publication now in preparation by FIPS Task Force 14 may soon be released. As described earlier in this report, this publication deals with the "Initiation Phase" of automated data systems. This new publication will provide guidelines for 3 document types:

Project Request Feasibility Study Cost/Benefit Analysis

These new documents are intended to be "stand-alone" documents, used in a similar fashion as the 10 FIPS PUB 38 Developmental Phase documents. Although they are somewhat redundant, both among themselves and with the FIPS PUB 38 documents, they do add new areas of documentation requirements.

It should thus be clear that FIPS PUB 38 is not appropriate in respect to complete system documentation. It is not so designed, but in fact, is part of a larger systems-oriented documentation approach. Moreover, still another FIPS PUB effort is being considered, to provide guidelines for the "Operation Phase" of the software life cycle. This area is also unaddressed by FIPS PUB 38.

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	DO	CUMENTATION WIT	Figure 2 HIN THE SJIS SOF	/ TWARE LIFE CYCLE				
	INITIATION PHASE		DEVELOF PHAS	PMENT SE		OPERATION PHASE		
	SJIS POLICY AND PLANNING DOCUMENT *	DEFINITION STAGE	DESIGN STAGE	PROGRAMMING STAGE	TEST STAGE	MAINTENANCE/AUDIT STAGES		
DOCUMENTS	FEASIBILITY STUDY DOCUMENT	FUNCTIONAL REQUIREMENTS DOCUMENT	SYSTEM/ SUBSYSTEM SPECIFICATION	USERS MANUAL		MAINTENANCE/CHANGE REPORTS *		
	PROJECT WORK PLAN			OPERATIONS MANUAL PROGRAM MAINTENANCE MANUAL		AUDIT REPORTS *	2	
			TES	ΤΡΙΔΝ				
	* TO BE DEVELOPED	.		L				
							•	

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A great deal of misunderstanding exists with regard to the use of FIPS PUB 38, especially focusing on possible redundancy and adherence to format. These problems seem to be a result of a limited reading of "Part 2, Documentation Considerations" of FIPS PUB 38. This section, which is also generally included in the new FIPS PUB document, gives an indication of the stylistic objectives of FIPS PUB 38, and its intended flexibility of application. The following quotes from FIPS PUB 38 must be considered: Redundancy. This repetition is deliberate in order to achieve

an independent but parallel basis for each guidelines . . . Introductory material has been included in each document

type to provide the reader with a frame of reference. This information has been included to minimize the need for crossreferencing to parts of other documents that may have been produced . . Since the documents are prepared at different points in the

software cycle, and the information is intended to be read by different audiences, such redundancy provides a "stand alone" approach for each guidelines . . .

Flexibility. An attempt has been made to provide a consistent organization scheme within the various document types. The following paragraphs describe options (emphasis added) which should be considered to achieve flexibility in the use of the guidelines . .

"Sizing" of Document Types. Each document type outlined may be used to prepare documents that range from a few to several hundred pages in length. The size depends on the size and complexity of the project and the judgment of the project man-ager as to the level of detail necessary for the environment in which the software will be developed or run . . .

Combining and Expanding Document Types. It is occasionally necessary to combine several document types under one cover (emphasis added) or to produce several volumes of the same document type. For example, two document types presented in this guideline may be combined into one. When this is done, the substance of the contents covered by each document type should be presented using the outline of that document type . . .

When a system is extremely large or is to be documented in a modular fashion, a document may be prepared for each module. In some cases, the size of a document may necessitate that it be issued in multiple volumes to allow ease of user reference. In such cases, the document should be separated at a section divi-

Format. The content guidelines . . . have been prepared using a generally consistent format. Use of this particular format is encouraged but is not essential (emphasis added). It is a tested

and accepted format . . . Sequencing of Contents. In general, the order of the sections and paragraphs in a particular document type should be the same as shown in the content guidelines . . . The order may be

changed if it significantly enhances the presentation . . . Section/Paragraph Titles. In general, the titles of sections and paragraphs should be the same as shown in the content guide-lines. The titles may be modified to reflect terminology unique to the software being documented if the change significantly enhances the presentation. Sections or paragraphs may be added or deleted as internal requirements dictate . . .

Expansion of Paragraphs. Many of the document types have paragraphs with a general title and a list of factors that might be discussed within that paragraph. The intent of the content guide-lines is not to prescribe a discussion of each of these items, but to suggest that these items be considered in writing that paragraph. These and all other paragraphs may be expanded and further subdivided to enhance the presentation . . .

Flowcharts/Decision Tables. The graphic representation of some problem solutions are treated best in the form of flow-charts, others in the form of decision tables. Either may be included in or appended to the documents produced . . .

 (γ)

Forms. The use of specific forms is dependent on practices in an agency. Some of the information specified in a paragraph in the content guidelines may be recorded on such forms. If so, the form can be referenced from the appropriate paragraph. The use of standard forms is encouraged Thus, FIPS PUB 38 should not be considered as rigidly

requiring the preparation of 10 redundant documents, but as a tool to supply guidance for a wide variety of system applications.

The use of FIPS PUB 38 as an inter-governmental standard might be meritorious, if there is the addition of the newer FIPS PUB documents which are planned, the addition of other planning documents, and the appropriate flexibility of use. However, an even more important consideration arises, which can surpass these prior additions. To quote from FIPS PUB 38:

Responsibilities. Separable responsibilities which are inherent in the flexible nature of these guidelines are:

- a. Definition of agency guidance (emphasis added) to project managers as to what documentation should be prepared under various conditions and, perhaps, to what levels of extent, detail, and formality . . .
- b. Determinatic a by a project manager of the documentation plan for a specific project, including:
 (1) What document types apply and should be prepared.
 (2) The formality, extent, and detail of the documentation.

 - (3) Responsibilities and a schedule of preparation for the
 - documentation.
 - (4) Procedures and schedule of review, approval, and distribution and the distribution list.
 - (5) Responsibilities for documentation maintenance and change control through the development phase.

The formality, extent, and level of detail (of documentation). will be more consistent if agency guidance and criteria are established . . . The Users, Operations, and Program Maintenance Manuals should be formal since they support the use of the soft-ware, particularly if the software will be used outside the developing organization or if extensive changes are expected during the life of the software.

Thus, an introductory documentation "Strategy" or "use" statement should precede any suggested documentation guidelines. FIPS PUB 38 is designed to operate with such an introduction, and may be too overly generalized for implementation in a judicial environment without such an introduction.

FIPS PUB 38 is thus inadequate as the guidelines for system documentation in a judicial environment for the following reasons:

- It is only *part* of a comprehensive documentation design, and will only partially fulfill documentation needs
- The judicial environment needs a combination planning/documentation package, specifying both the planning activities and the resulting documentation
- An introductory "SJIS Policy and Planning Document" must be added, to specify the options and alternatives which FIPS PUB 38 provides.

Documentation Guidelines

In addition to evaluating the use of FIPS PUB 38 as a documentation guideline, the study team was called upon to provide interim system documentation guidelines. The Appendix provides document content guidelines that could be used in a state judicial environment. These guidelines consist of documents contained within FIPS PUB 38, documents similar to those being prepared for the FIPS PUB

"Initiation Phase" document, guidelines similar to those contained within the SJIS final report (Phase II), and other documents necessary to properly complement the judicial planning process. These guidelines should be considered an interim set of guidelines which should also be accompanied by a "strategy" or "use" prologue. This prologue should be prepared, as should parallel system planning guidelines, so that a total judicially-oriented planning/documentation approach is available.

The interim guidelines provide for the production of the following documents:

System Management Overview Document

Provides an encapsulation of project attributes for a quick understanding of the proposed system by management, such as judges or court administrators.

Written in "non-technical" language.

Can be used with other documents to provide an introduction to the system.

Feasibility Study Document

Utilized prior to decisions to implement the project, as a basis for those decisions.

Analyzes the existing system and determines the unmet needs.

Specifies the general functional requirements the system must provide.

Generally specifies the attributes of the proposed system, as alternatives and recommendations.

Proposes a general work plan and schedule. Project Work Plan

Provides a reference tool to be utilized as a benchmark throughout system development.

Details task activities, workload, schedule and budget.

Provides a means of measuring progress.

Functional Requirements Document Describes the development group's understanding of

the user group's requirements for an operational capability.

Written in "user language" minimizing technical terminology about ADP hardware.

Contains an analysis of methods, impacts, cost requirements, and opeating environment.

Submitted to the user for concurrence, and to user management for approval, prior to preparing detailed system specifications,

Basic reference document for determining the impact of any change to the scope of the project made prior to user acceptance.

Contains a development plan identifying milestones and participation by other organizations. System/Subsystem Specificaiton

Describes the system structure, function, and flow to analysts and programmers in the development group, at a level of detail beyond the functional description.

Written as a technical document, in enough detail to carry out program design and coding.

Contains performance requirements and design logic for the system/subsystem.

Submitted to development management for review and approval.

Defines the types of interfaces with other systems/ subsystems and the operating environment.

Basic reference for assessment of impact of design changes approved by the user, within the scope of the described system.

User's Manual

Describes how the user group will use the automated data systems and computer programs prepared by the development group.

Written in user format, with user terminology. Contains instructions and procedures for data entry, equipment operations, interactive queries, and sample outputs. Sections 1 and 2 are directed toward user management. Sections 3 and 4 are directed to the users.

Submitted to user management and staff for approval, and may be used as basis for training.

Basic reference document for determination of the impact of changes on procedures, and impact of computer system changes on procedures. Has the equivalent level of detail for users as the Program Specification does for the development group.

Program Maintenance Manual

Describes the accepted, operational computer programs for the maintenance programmers, who are responsible for making changes to those programs. The design approach, program logic, related data, and operating characteristics are described.

Contains diagrams and listings of source code for the operational version of programs, and narrative explanations of interfaces, parameters, codes and messages.

Describes interface and dependencies with the operating system.

Provides a history of changes within the scope of the original requirements.

Refers or contains test information and test data. **Operations** Manual

Describes how the computer operations personnel will initiate, run, and complete processing of the job.

Written in operations terminology, and usually follows a step-by-step scenario.

Contains instructions and procedures for routine operations and for recover (i.e., non-routine operations.)

Contains instructions and procedures for remote terminal operations, if they are required for data entry or remote batch operations.

Test Plan

Describes the test plan, testing procedures, test criteria, and evaluation criteria.

Written as a non-technical document for users and staff personnel conducting tests; and in approriate technical terminology for analysts, programmers, and operations personnel.

Contains test specifications and details concerning the step-by-step testing procedures.

Testing procedures should cover all interfaces among system/subsystems, programs, and data bases; and describe the relationship among test programs or functions.

Test methodology, data, and results should be retained for verification of the tests.

SUMMARY

Pending the development of other FIPS PUB documents, these interim guidelines can be utilized by SJIS administrators to organize, structure, and evaluate the documentation prepared for their individual systems. The resulting documentation could assist system development, maintenance, and transfer efforts and should reduce long-term costs. To fully utilize these guidelines, an SJIS Policy and Planning document should be prepared, which includes these interim guidelines as an appendix, and describes the methods and options available during planning/ documentation.

APPENDIX CONTENT GUIDELINES FOR RECOMMENDED SJIS DOCUMENTATION TYPES

INTRODUCTION

This appendix provides content guidelines for the following nine document types that analyses by the study team indicated the most appropriate to prepare, from both a staff workload and cost viewpoint, during local State Judicial Information System developmental activities.

1. Systems Mangement Overview Document

- Feasibility Study Document Project Work Plan 3
- 4. Functional Requirements Document
- 5. System/Subsystem Specification
- 6. Users Manual

7. Program Maintenance Specification

8. Operations Manual

9. Test Plan

The recommendation to prepare only these nine documents should not be interpreted to mean that these are the only document types needed. Our preference, if time, resources and dollars permitted, would be that other specific purpose system documents be prepared, especially a sector-specific "use" statement. Recognizing the limitations faced by court adminstrators, we have proposed this alternative which satisfies the minimum documentation needs of the SJIS project environments.

1. SAMPLE SYSTEM MANAGEMENT OVERVIEW DOCUMENT TABLE OF CONTENTS

Page

1. GENERAL INFORMATION A. Summary Environment Β. C. References 2. MANAGEMENT SUMMARY A. Requirements B. Objectives Assumptions and Constraints Ĉ. D. MethodologyE. Evaluation Criteria F. Summary of Recommendations G. Alternatives Considered 3. DETAILED SYSTEM REQUIREM A. Outputs B. Inputs C. Files Description D. Validation E. Processing/Data FlowF. Security, Privacy and Control G. Information Storage and Retriev
 4. ANALYSIS OF EXISTING SYSTE A. Processing/Data Flow B. Workload C. Costs D. Personnel Equipment E. F. Limitations 3 1. GENERAL INFORMATION A. Summary. Summarize the generation posed system including end prod justification. B. Environment. Identify the: Ĵ 1. Project sponsor, developer, center or network where th plemented. 2. System input, output, process privacy requirements. 3. Interaction with other system C. References. List applicable refer 豪 1. Project request (authorization 2. Previously published docume 3. Documentation concerning re 4. FIPS publications and other ref 2. MANAGEMENT SUMMARY Present an overview of pertinent fac proposed system addresses curren E (ments. Include statements of system jectives, assumptions and constrai evaluation criteria, and a summary of 1

3

1. STATEMENT OF PROBLEM

1. STATEMENT OF PROBLEM

3. PROJECT SCOPE DESCRIPTION

4. ASSUMPTIONS AND CONTRAINTS5. ORGANIZATIONS AFFECTED

2. GOALS AND OBJECTIVES

6. ENVIRONMENT

7. REFERENCES

This section provides a brief description of the problem which the proposed system will eliminate or assist in resolving.2. GOALS AND OBJECTIVES

This section describes the basic requirements or goals and objectives of the software project in terms of improved or increased performance and/or reduced operating costs.

PROJECT SCOPE DESCRIPTION
 This section describes the scope of the project in respect to functional requirements, organizational impact and anticipated duration of the project.

 ASSUMPTIONS AND CONTRAINTS

4. ASSUMPTIONS AND CONTRAINTS This section presents the assumptions and contraints on which the proposed system activities will be based.

5. ORGANIZATIONS AFFECTED

This section describes the agencies to be served by the project in terms of general functions to be performed by the agencies rather than in terms of organizational structure.

6. ENVIRONMENT

This section identifies the project sponsor, developer, users and computer center on which the system is to be implemented.

REFERENCES
 This section of the document identifies: all previously published documents on the subjects; documentation concerning related projects; publications which will be used as guidelines or standards in developing the system; and system authorizations.

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2. SAMPLE FEASIBILITY STUDY DOCUMENT TABLE OF CONTENTS

Page	5. PROPOSED SYSTEM 2
1	A. Details of Proposed System 2
1	1. Outputs 2
1	2. Inputs 2
1	3. Files Description 2
1	4. Validation 2
. 1	5. Processing/Data Flow 2
. 1	6. Information Storage and Retrieval 2
1	7. ADP Equipment 2
2	8. Telecommunication 2
2	9. Implementation Schedule 2
2	B Summary of Improvements 2
	C Summary of Impacts 3
2 (EN15) 2	1. Software Impacts 3
2	2. Equipment Impacts 3
$\tilde{2}$	3. Site/Facility Impacts 3
$\overline{2}$	4. Organization Impacts 3
2	5. Operational Impacts 3
2	6. Developmental Impacts 3
val 2	7. Cost Impacts 5
EM 2	6. ALTERNATIVES 3
2	7. RECOMMENDATIONS 5
· 2	ADDENDIX A Details of Feasible Alternative Systems 3
2	APPENDIX A. Detailed Personnel Requirements for 3
2	Alternative Systems
2	APPENDIX C. Details of Cost Benefit Analysis 3
	Detailed analysis is presented in Section 3.
al nature of the pro-	A. Requirements. State the requirements of the pro-
ducts, schedule and	posed system, such as:
	1. New service.
-	2. Increased capacity.
user, and computer	3. Legislative and policy requirements.
ne software is im-	4. Privacy and security.
ning and approximited	5. Audit controls.
ssing, and security/	6. Targeticompletion aute.
s or organization	B. Objectives. State the major performance objectives
rences such as:	of the proposed system, such as:
1).	rental costs
ents on the project.	2 Increased processing speed
elated projects.	3. Increased productivity.
ference documents.	4. Improved management information services.
	5. Prevention of automatic computer issuance of in-
cts to assure that the	correct payments.
nt system require-	6. Improved manpower utilization.
n requirements, ob-	C. Assumptions and Constraints. Present the assump-
ints, methodology,	tions and constraints of this study. Include elements
recommendations.	such as:

Page 1

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2. SAMPLE FEASIBILITY STUDY DOCUMENT (continued)

- 1. Operational life by the proposed system.
- 2. Period of life for comparison of system alternatives
- 3. Interaction of the proposed system with other systems and organizations.
- 4. Input, processing and output requirements.
- 5. Legislative and policy constraints.
- 6. Methodology. Identify how this study was accomplished and how the proposed system was evaluated. Summarize the general method or strategy employed, such as: survey, weighting, modeling, benchmarking or simulation.
- 7. Evaluation Criteria. Identify the criteria employed in arriving at the recommendations summarized in paragraph C. 8, such as: cost, priority, development time or ease of use.
- 8. Summary of Recommendations. Summarize the recommendation of this feasibility study, the results of not taking action, and what delays can be tolerated.
- 9. Alternatives Considered. Summarize each alternative system considered and state the reason for non-selection.
- **3. DETAILED SYSTEM REOUIREMENTS**

Describe in detail the requirements of the proposed new system, or the proposed change to the existing system. State the requirements as defined in the following paragraphs.

- A. Outputs. Describe system outputs, e.g., reports, documents or data. For each output, include specifics such as use, frequency of production, interfaces and distribution.
- B. Inputs. Describe system inputs including: source of data; type, volume, and organization of data; and frequency of submission.
- C. Files Description. Describe the contents, purpose, use, and update frequency of each file.
- C. Validation. Describe any validation criteria.
- E. Processing/Data Flow. Describe the major processing/data flow. The flow should be presented in graphic form e.g., flowchart or block diagram or supplemented by narrative.
- F. Security, Privacy and Control. State the detailed requirements for security, privacy and control.
- G. Information Storage and Retrieval. Specify any information storage and retrieval requirements.

4. ANALYSIS OF EXISTING SYSTEM

The purpose of analyzing the existing system is to provide a basis for determining the economic and mangement advantages of the proposed new system or change. This section should include the information in the following paragraphs.

- A. Processing/Data Flow. Describe the major processing/data flow of the existing system. The flow should be presented in graphic form, e.g., flowchart
- or block diagram, supplemented by narrative. B. Workload. Specify the volume of work handled by the existing system.
- C. Costs. Itemize costs incurred in operating the existing system, e.g., manpower, equipment, space, support services, materials, and overhead. Details of Page 2

costs may be presented in a Cost/Benefit Analysis Document rnd/or an appendix to this document. D. Personnel. Identify skill and number of personnel

- required to operate/maintain the existing system. E. Equipment. Itemize any ADP or telecommunication
- equipment used by the existing system. F. Limitations. Identify any limitations of the existing
- system, such as inadequate or untimely information needed to make a decision, delay in getting data to the user, resource constraints, and organization and policy problems.

5. PROPOSED SYSTEM

Major performance objectives were specified in Paragraph 2.2, and detailed system requirements were listed in Section 3. Input from or output to other automated systems must be fully coordinated, in detail, at this point. All cognizant parties must be made aware of cross system impact of proposed future design or maintenance changes. A formal control point for clearing such proposals may be established.

- A. Details of Proposed System. Present the details of the proposed system as described in the following paragraphs.
 - 1. Outputs. Describe required outputs to be produced by the system, e.g. reports, documents or data. For each output, include use, frequency of production, interface and distribution.
 - 2. Inputs. Describe system inputs. For each input include: source of data; type, volume, and organization of data; and frequency of submission.
- 3. Files Description. Describe the contents, purpose, use, and update frequency of each file.
- Validation. Describe any validation criteria. 5. Processing/Data Flow. Describe the major pro-
- cessing/data flow. The flow should be presented in graphic form, e.g. flowchart or block diagram, supplemented by narrative.

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- 6. Information Storage and Retrieval. Specify any information storage and retrieval requirements.
- 7. ADP Equipment. State the required characteristics of the equipment, and the need for interface and compatibility with other systems.
- 8. Telecommunication. State the required telecommunication characteristics.
- 9. Implementation Schedule. Include timeframes and milestones for the development and implementation of the proposed system. 10. *Personnel*. Identify skill and number of person-
- nel required to develop/operate/maintain the proposed system.
- B. Summary of Improvements. Itemize improvements to be obtained from the proposed system, such as:
- New or upgraded capabilities.
- Elimination or reduction or existing capabilities that are no longer needed.
- Improved timeliness, e.g., decreased response time or processing time.
- Elimination of existing deficiencies.
- Improved management information services.
- Improved manpower utilization.

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• Cost/benefits (see Cost/Benefit Analysis Document).

- Operating center procedures.
- Operating center/user realtionships.
- ness).
- Data entry procedures.
- storage and retrieval procedures.
- schedules.
- cedures.
- 6. Developmental Impacts. Summarize developmental impacts, such as: • Specific activities to be performed by the user in
- tem.
- Computer processing resources required to develop and test the new system.
- Privacy and security implications.
- 7. Cost Impacts. If a detailed Cost/Benefit Analysis Document was not prepared, describe resource and cost factors that may influence the develop-

- impacts of the proposed system, including potential conversion problems.
 - 1. Software Impacts. Summarize any additions or modifications needed to existing applications and support software in order to adapt them to the proposed system.
 - 2. Equipment Impacts. Summarize new equipment requirements and/or changes to currently available equipment.
 - 3. SitelFacility Impacts. Summarize building modification requirements.
 - 4. Organizational Impacts. Summarize any organizational changes, and any increase/decrease in personnel and/or skill level.
 - 5. Operational Impacts. Summarize new or mod-
 - ified operational requirements, such as:
 - User operating procedures.

• Source data (sources, volume, media, timeli-

2. SAMPLE FEASIBILITY STUDY DOCUMENT (continued)

C. Summary of Impacts. Summarize the anticipated

• Data retention requirements and information • Output reporting procedures, media, and

• System failure consequences and recovery pro-

support of development of the proposed sys-

• Resources required to develop the data base.

ment, design, and continued operation of the proposed system. Discuss other factors which may determine requirements, such as interfaces with other automated systems and telecommunication facilities.

If a detailed Cost/Benefit Analysis Document was prepared, summarize its findings.

6. ALTERNATIVES

Compare and describe each alternative system considered, addressing the factors presented in Section 5. State the reasons for non-selection.

7. RECOMMENDATIONS

Based on the alternatives considered in Sections 5 and 6. recommend the system alternative believed to be the most technically and economically feasible and most capable of meeting the stated requirements (see Section 3). State the reasoning which supports the recommendation, including all tangible and intangible benefits, required resources, possible delays, the effects of delay. and results of not taking action. 8. PROPOSED SCHEDULE

Outline a proposed schedule to include Detail System Design, Programming, Program Test, Conversion and Implementation. Identify major milestones and management decision points.

APPENDIX A - Details of Feasible Alternative Systems

Provide detailed characteristics of software systems considered as alternatives to the existing software system. Include data from the cost/benefit analysis, as appropriate.

APPENDIX B - Detailed Personnel Requirements for Alternative Systems

Provide personnel characteristics and modified personnel requirements for the software systems being considered as alternatives to the current software system. Include data from the cost/benefit analysis, as appropriate.

APPENDIX C - Details of Cost/Benefit Analysis Provide the detailed characteristics defined in Sections 3 through 7 of the Cost/Benefit analysis.



4. SAMPLE FUNCTIONAL REQUIREMENTS DOCUMENT **TABLE OF CONTENTS**

Dage	2 DECLUDEMENTS
1 ago	5. REQUIREMENTS
1	A. Functions
1	P. Derformance
1	D. I enformance
1	1. Accuracy
1	2 Validations
*	
1	3. Timing
1	4 Flexibility
1	C Incute Outcute
1	C. Inputs-Outputs
ī	D. Data Characteristics
1	E Enilure Contingencies
1	E. Fanure Contingencies
1	
-	A ODED ATINC ENVIRONMENT
1	4. OPERATING EN VIRONMENT
. 2	A. Equipment
ĩ	B Support Software
2	D. Support Software
2	C. Interfaces
° O	D. Security and Privacy
2	E Controla
2	E. Controis
2 2	
2	
. 2	J. DEVELOPMENT PLAN

D. Proposed Methods and Procedures. Describe the proposed software and its capabilities. Identify techniques and procedures from other software that will be used or that will become part of the proposed software. Identify the requirements that will be satisfied by the proposed software. Include information on:

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- Organizational and personnel responsibilities.
- Equipment available and required.
- Volume and frequency of inputs and outputs.
- Deficiencies and limitations.
- Pertinent cost considerations (developmental as well as operational).

Illustrate the proposed data flow to present an overall view of the planned capabilities. Describe any capabilities in the existing software that may be changed by the proposed software. State the reasons for these changes. Explain the sequence in which operational functions are to be performed by the user.

- E. Summary of Improvements. Itemize improvements to be obtained from the proposed software, such as: • New capabilities.
- Upgraded existing capabilities.
- Elimination of existing deficiencies.
- Improved timeliness, e.g., decreased response time or processing time.
- Elimination or reduction of existing capabilities that are no longer needed.

F. Summary of Impacts. Summarize the anticipated impacts of the proposed software on the present system, in the following categories:

1. Equipment Impacts. Summarize changes to cur-

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4. SAMPLE FUNCTIONAL REQUIREMENTS DOCUMENT (continued)

rently available equipment, as well as new equipment requirements and building modifications.

- 2. Software Impacts. Summarize any additions or modifications needed to existing applications and support software in order to adapt them to the proposed software.
- 3. Organizational Impacts. Summarize organizational impacts, such as:
 - Functional reorganization.
 - Increase/decrease in staff level,
 - Upgrade/downgrade of staff skills.
- 4. Operational Impacts. Summarize operational impacts, such as modifications to:
 - Staff and operational procedures.
 - Relationships between the operating center and the users.
 - Procedures of the operating center.
- Data (sources, volume, medium, timeliness).
- Data retention and retrieval procedures.
- Reporting methods.
- System failure consequences and recovery procedures.
- Data input procedures.
- Computer processing time requirements. 5. Developmental Impacts. Summarize developmental impacts, such as:
 - Specific activities to be performed by the user in support of development of the proposed software.
 - Resources required to develop the data base.
- Computer processing resources required to develop and test the new software.
- G. Cost Considerations. Describe resource and cost factors that may influence the development, design, and continued operation of the proposed software. Discuss other factors which may determine requirements, such as interfaces with other automated systems and telecommunication facilities.
- H. Alternative Proposals. If alternative software has been proposed to satisfy the requirements, describe each alternative. Compare and contrast the alternatives. Explain the selection reasoning.

3. REOUIREMENTS

- A. Functions. State the functions required of the software in quantitative and qualitative terms, and how these functions will satisfy the performance objectives.
- B. Performance. Specify the performance requirements.

1. Accuracy. Describe the data accuracy requirements imposed on the software, such as:

- Mathematical
- Logical
- Legal
- Transmission
- 2. Validation. Describe the data validation requirements imposed on the software.
- 3. Timing. Describe the timing requirements imposed on the software, such as, under varying conditions; Page 2

- Response time.
- Update processing time.
- Data transfer and transmission time.
- Throughput time.
- 4. *Flexibility*. Describe the capability for adapting to changes in requirements, such as:
- Changes in modes of operation.
- Operating environment.
- Interfaces with other software.
- Accuracy and validation timing.

• Planned changes or improvements. Identify the software components which are specifically designed to provide this flexibility.

- C. Inputs-Outputs. Explain and show examples of the various data inputs. Specify the medium (disk, cards, magnetic tape, format, range of values, accuracy, etc.) Provide examples and explanation of the data outputs required of the software, and any quality control outputs that have been identified. Include descriptions or examples of hard copy reports (routine, situational and exception) as well as graphic or display records.
- D. Data Characteristics. Describe individual and composite data elements by name, their related coded representations, as well as relevant dictionaries, tables. and reference files. Estimate total storage requirements for the data and related components based on expected growth.
- E. Failure Contingencies. Specify the possible failures of the hardware or software, the consequences (in terms of performance), and the alternative courses of action that may be taken to satisfy the information requirements. Include:
- Back-up. Specify back-up techniques, i.e., the redundancy available in the event the primary system goes down. For example, a back-up technique for a disk medium would be to record periodically the contents of the disk to a tape.

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- Fallback. Explain the fallback techniques, i.e., the use of another system or other means to accomplish some portion of requirements. For example, the fallback technique for an automated system might be manual manipulation and recording of data.
- Recovery and Restart. Discuss the recovery and restart techniques, i.e., the capability to resume execution of software from a point in the software subsequent to which a hardware or software problem occurred, or the re-running of the software from the beginning.

4. OPERATING ENVIRONMENT

- A. Equipment. Identify the equipment required for the operation of the software. Identify any new equipment required and relate it to specific functions and requirements to be supported. Include information such as:
- Processor and size of internal storage.
- Storage, online and offline, media, form, and devices.

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- Data transmission devices. B. Support Software. Identify the support software and describe any test software. If the operation of the software depends on changes to support software,
- C. Interfaces. Describe the interfaces with other software.
- D. Security and Privacy. Describe the overall security and privacy requirements imposed on the software. If no specific requirements are imposed, state this fact.

4. SAMPLE FUNCTIONAL REQUIREMENTS DOCUMENT (continued)

identify the nature and planned date of these changes.

E. Controls. Describe the operational controls imposed on the software. Identify the sources of these controls.

5. DEVELOPMENT PLAN

Discuss in this section the overall management approach to the development and implementation of the proposed software. Include a list of the documentation to be produced, time frames and milestones for the development of the software, and necessary participation by other organizations to assure successful development.

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TABLE OF	CONTENTS				E Costrola Dere 1
PagePage1. GENERAL INFORMATION1A. Summary1B. Environment1	A. Equipment1B. Support Software1C. Interfaces1				 E. Cor trols. Describe the oper on the system/subsystem. these controls. 4. DESIGN CHARACTERIST
C. References1REQUIREMENTS1A. Description1B. Functions1	D. Security and Privacy1E. Controls24. DESIGN CHARACTERISTICS2A. Operations2	Aller -			 A. Operations. Describe the op the user and computer center be operational. B. System/Subsystem Logic. In the optimal system/subsystem
C. Performance11. Accuracy12. Validation13. Timing1	B. System/Subsystem Logic25. PROGRAM SPECIFICATIONS2A. Program (Identify) Specification2B. Program (Identify) Specification2C. DUUTENER2	BAB		-	chart. The flow should provi tation of the system/subsystem trances and exits, compu software controls and data
4. Flexibility I OPERATING ENVIRONMENT 1	6. EXHIBITS (attach as required)				sortware, controls and data
. GENERAL INFORMATION					
 A. Summary. Summarize the specifications and functions of the system/subsystem to be developed. B. Environment. Identify the project sponsor, devel- 	 Update processing time. Data transfer and transmission time. Throughput time. 				
oper, user and computer center or network on which the system is to be implemented. C. References. List applicable references, such as:	 4. Flexibility. Describe the capability for adapting the program to changes in requirements, such as: Changes in modes of operation. 				
 Project request (authorizations). Previously published documents on the subject. Documentation concerning related projects. 	 Operating environment. Interfaces with other software. Accuracy and validation and timing. 		: ·		
4. SJIS and FIPS publications and other reference documents.	• Planned changes or improvements. Identify the system/subsystem components which are specifically designed to provide this flexibil-				
A. Description. Provide a general description of the system/subsystem to establish a frame or reference for the remainder of the document. Include a sum-	ity. 3. OPERATING ENVIRONMENT A. Fourinment Identify the equipment required for the				
mary of functional requirements to be satisfied by this system/subsystem. Show the general interrelation- ship of the system/subsystem components.	operation of the system/subsystem. Identify any new equipment required and relate it to specific functional requirements to be supported. Include information,				
B. Functions. Specify the system/subsystem functions in quantitative and qualitative terms and how the functions will satisfy the functional requirements.	 such as: Processor and size of internal storage. Storage, online and offline, media, form, and de- 				
 C. Performance. 1. Accuracy. Describe the data accuracy requirements imposed on the system, or subsystem, such 	 vices. Input/Output devices, online and offline. Data transmission devices. 	ar vaner werste Die same		-	
as: Mathematical Logical	B. Support Software. Identify the support software and describe any test software. If the operation of the system/subsystems depends on changes to support			-	
 Legal Transmission <i>Validation</i>. Describe the data validation require- 	software, identify the nature and planned date of these changes. C. Interfaces. Describe the interfaces with other	And the second of the second o		-	
ments imposed on the system/subsystem. 3. <i>Timing</i> . Describe the timing requirements imposed on the software, such as, under varying conditions:	software. D. Security and Privacy. Describe the overall security and privacy requirements imposed on the system/ subsystem. If no specific requirements are imposed	1		-	
Response time	state this fact		a construction of the second se		

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5. SAMPLE SYSTEM/SUBSYSTEM SPECIFICATION (continued)

erational controls imposed . Identify the sources of

- 5. PROGRAM SPECIFICATIONS

 A. Program(Identify) Specification. Specify the system/subsystem functions to be satisfied by the computer program.
 Describe the program requirements.
 Describe the operating environment.
 Describe the design characteristics of the program including inputs, program logic, outputs, and data base.

 - base.
 - B. Program (Identify) Specification. Describe the second computer program in a manner similar to the paragraph above.
- operating characteristics of ters where the software will
- ovide an integrated presen-system dynamics, of enputer programs, support ta flow.

6. SAMPLE USERS MANUAL

TABLE OF CONTENTS

Page

- 1. GENERAL INFORMATION
- A. Summary
- B. Environment
- C. References
- 2. APPLICATION
- A. Description
- B. Operation
- C. Equipment
- D. Structure
- E. Performance
- F. Data Base

G. Inputs, Processing, and Outputs

- 1. GENERAL INFORMATION
- A. Summary. Summarize the application and general functions of the software.
- B. Environment. Identify the user organization and computer center where the software is installed.
- C. References. List applicable references, such as:
- 1. Project request (authorization).
- 2. Previously published documents on the project.
- 3. Documentation concerning related projects and software
- 4. FIPS publications and other reference documents.

2. APPLICATION

- A. Description. Describe when and how the software is used and the unique support provided to the user organization. The description should include: 1. Purpose of the software.
- 2. Capabilities and operating improvements provided.
- 3. Functions performed.
- B. Operation. Show the operating relationships of the functions performed to the organization that provides input to and receives output from the software. Describe security and privacy considerations. Include genetal charts and a description of the inputs and outputs shown on the charts.
- C. Equipment. Describe the equipment on which the software can be run.
- D. Structure. Show the structure of the software and describe the role of each component in the operation of the software.
- E. Performance. Describe the performance capabilities of the software including where appropriate:
- 1. Quantitative information on inputs, outputs, re-
- sponse time, processing times, and error rates. 2. Qualitative information about flexibility and reliability.
- F. Data Base. Describe all data files in the data base that are referenced, supported, or kept current by the

- 3. PROCEDURES AND REOUIREMENTS A. Initiation B. Input 1. Input Formats 2. Sample Ouputs C. Output 1. Output Formats 2. Sample Outputs D. Error and Recovery E. File Query

software. The description should include the purpose for which each file is maintained.

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G. Inputs, Processing, and Outputs. Describe the inputs, the flow of data through the processing cycle, and the resultant outputs. Include any applicable relationships among inputs and outputs.

3. PROCEDURES AND REQUIREMENTS

- This section should provide information about initiation procedures, and preparation of data and parameter inputs for the software. The scope, quality, and logical arrangement of the information should enable the user to prepare required inputs and should explain in detail the characteristics and meaning of the outputs. It should also describe error, recovery, and file query procedures and requirements.
- A. Initiation. Describe step-by-step procedures required to initiate processing.
- B. **Input.** Define the requirements of preparing input data and parameters. Typical considerations are:
 - Conditions e.g., personnel transfer, out of stock.
 - Frequency e.g., periodically, randomly, as a function of an operational situation.
 - Origin e.g., Personnel Section, Inventory Control.
- Medium e.g., keyboard, punched card, magnetic or paper tape.
- Restrictions e.g., priority and security han-dling, limitations on what files may be accessed by this type of transaction.
- Quality control e.g., instructions for checking reasonableness of input data, action to be taken when data appears to be in error, documentation of errors.
- Disposition e.g., instructions necessary for retention or release of all data files received, other recipients of the inputs.
- 1. Input Formats. Provide the layout forms used in

- the initial preparation program data and parameter inputs. Explain each entry, and reference it to the sample form. Include a description of the grammatical rules and conventions used to prepare input, such as:
- Length e.g., characters/line, characters/ item.
- Format e.g., left justified.
- Labels e.g., tags or identifiers. • Sequence — e.g., the order and placement of
- items in the input.
- bols (virgule, asterisk, character combinations, etc.) to denote start and end of input, of lines, of data groups, etc.
- Combination e.g., rules forbidding use of groups of particular characters, or combinations of parameters in an input.
- Vocabulary e.g., an appendix which lists the allowable character combinations or codes that must be used to identify or compose input items.
- Omissions and Repeats e.g., indicate those elements of input that are optional or may be repeated.
- Controls e.g., header or trailer control data.
- 2. Sample Inputs. Provide specimens of each complete input form. Include:
 - Control or header e.g., entries that denote the input class or type, date/time, origin, and instruction codes to the software.
 - Text e.g., subsections of the input representing data for operational files, request parameters for an information retrieval program.
- Trailer e.g., control data denoting the end of input and any additional control data.
- Omissions e.g., indicate those classes or types of input that may be omitted or are optional

• Repeats - e.g., indicate those positions of the input that may be repeated. C. Output. Describe the requirements relevant to each output. Typical considerations are:

- Use e.g., by whom and for what. • Frequency - e.g., weekly, periodically, or on demand.
- Variations --- e.g., modifications that are available to the basic output.

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6. SAMPLE USERS MANUAL (continued)

• Punctuation — e.g., spacing and use of sym-

- Destination e.g., computer area, remote terminal
- Medium e.g., printout, CRT, tape, cards.
- Quality control e.g., instructions for identification, reasonableness checks, editing and error correction.
- Disposition e.g., instructions necessary for retention or release, distribution, transmission, priority, and security handling.
- 1. Output Formats. Provide a layout of each output. Explanations should be keyed to particular parts of the format illustrated. Include:
- Header e.g., title, identification, date, number of output parts.
- Body e.g., information that appears in the body or text of the output, columnar headings in tabular displays, and record layouts in machine readable outputs. Note which items may be omitted or repeated.
- Trailer e.g., summary totals, trailer labels.
- 2. Sample Outputs. Provide a sample of each type of output. For each item on a sample, include:
- Definition e.g., the meaning and use of each information variable.
- Source e.g., the item extracted from a specific input, from a data base file, or calculated by software.
- Characteristics e.g., the presence or absence of the item under certain conditions of the output generation, range of values, unit of measure.
- D. Error and Recovery. List error codes or conditions generated by the software and corrective action to be taken by the user. Indicate procedures to be followed by the user to ensure that any restart and recovery capability can be used.
- E. File Query. Perpare this paragraph for software with a file query retrieval capability. Include detailed instructions necessary for initiation, preparation, and processing of a query applicable to the data base. Describe the query capability, forms, commands used, and control instructions required.

If the software is queried through a terminal, provide instructions for terminal operators. Describe terminal setup or connect procedures, data or parameter input procedures, and control instructions. Reference related materials describing query capabilities, languages, installation conventions and procedures. program aids, etc.

TABLE OF	CONTENTS		
PageGENERAL INFORMATION1A. Suromary1B. Environment1C. References1PROGRAM DESCRIPTIONS1A. Program (Identify) Description11. Problem and Solution Method12. Input13. Processing14. Output15. Interfaces16. Tables17. Run Description18. Program (Identify) Description19. Program (Identify) Description10. OPERATING ENVIRONMENT1	A. Hardware1B. Support Software11. Operating System12. Compiler/Assembler13. Other Software1C. Data Base24. MAINTENANCE PROCEDURES2A. Programming Conventions2B. Verification Procedures2C. Error Correction Procedures2D. Special Maintenance Procedures2E. Listings and Flowcharts25. EXHIBITS2(Attach as required)3		software used includi tems, report generator C. Data Base. Describe or r the data base used. Inc codes, units of measur values, or reference a da 4. MAINTENANCE PROCE A. Programming Conventi the programming convent B. Verification Procedures procedures to check the grams, either general or fe
 GENERAL INFORMATION A. Summary. Summarize the general nature of the software to be maintained. B. Environment. Identify the project sponsor, developer, user and computer center or network where the software is implemented. C. References. List applicable references, such as: Project request (authorizations). Previously published documents on the project. Documentation concerning related projects. FIPS publications and other reference documents. PROGRAM DESCRIPTIONS Describe the program or programs in the system/subsystem for the maintenance programmer. If a complex system is being described, provide a general description of that system identifying each program and its functions. A. Program (Identify) Description. Identify the program by title, tag or label, and programming language. <i>Problem and Solution Method</i>. Describe the problem to be solved or the program function and the solution method used. <i>Input</i>. Describe the input to the program and provide a layout. Identify the medium used. Include information, such as codes, units of measurement, format, range of values, or reference a data element directory. <i>Describe processing features</i> and purposes important to the maintenance programmer, such as: Processing logic. Linkages. Variables and constants. Formulas. 	 Locations, settings, internal switches and flags. Shared storage. Output. Describe the output of the program and provide a layout. Identify the medium used. Interfaces. Describe the interfaces with other software, such as data formats, messages, parameters, conversion requirements, interface procedures, and media. Tables. Identify each table and its items. Describe the location, structure, and purpose of each. Run Description. Describe or reference the operating procedures to run the program including loading, operating, terminating, and error handling. Program (Identify) Description. Describe the second computer program in a manner similar to that used in paragraph 2.A. OPERATING ENVIRONMENT A. Hardware. Identify the equipment required for the operation of the system. Describe any unusual features used. Relate the hardware to each program. Include information, such as: Processor and size of internal storage. Storage online or offline, media, form, and devices. Bupport Software. Identify the support software needed for each computer program. Operating System. Identify and describe the operating system including the version or release number and any special features used. 		
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- reference documentation on

SAMPLE PROGRAM MAINTENANCE MANUAL (continued)

ling data management sys-

clude information such as arement, format, range of ata element directory.

EDURES tions. Identify and describe

entions used. es. Describe the verification ne performance of the pro-following modifications. In-

- clude a reference to test data and testing procedures. C. Error Correction Procedures. Describe all error conditions, their sources, and procedures for their correction.
- correction.
 D. Special Maintenance Procedures. Describe any special procedures required for the maintenance of the programs. Include information such as periodic purges of the data base, temporary modifications needed for leap years or century changes, etc.
 E. Listings and Flowcharts. Reference, append or describe the method for obtaining copies of listings of the programs and flowcharts.

9. SAMPLE TEST PLAN DOCUMENT 8. SAMPLE OPERATIONS MANUAL TABLE OF CONTENTS TABLE OF CONTENTS Ű. Page 1. Control Inputs 1. GENERAL INFORMATION 1. GENERAL INFORMATION 2. Operating Information A. Summarv A. Summary 3. Input-Output Files B. Environment and Pretest Backgr B. Environment Output Reports C. References Reproduced Output Reports Restart/Recovery Procedures C. References 2. PLAN î 2. OVERVIEW A. Software Description D. Run Description (Identify) 4. NON-ROUTINE PROCEDURES · A. Software Organization B. Milestones **B.** Program Inventory C. Testing (Identify Location) 5. REMOTE OPERATIONS C. File Inventory 3. DESCRIPTION OF RUNS 1. Schedule 6. EXHIBITS 2. Requirements A. Run Inventory (attach as required.) 3. Testing Materials B. Run Progression 4. Testing Training 1 C. Run Description (Identify) D. Testing (Identify Location) 3. SPECIFICATIONS AND EVALUA A. Specifications 1. Requirements **1. GENERAL INFORMATION** • Operating requirements. • Initiation method, such as on request, at pre-2. Software Functions A. Summary. Summarize the general functions of the 3. Test/Function Relationship software. determined time, etc. B. Environment. Identify the software sponsor, devel-• Estimated run time and turnaround time. Ć. oped, user organization and the computer center • Operator commands and messages. • Contacts for problems with the run. where the software is to be installed. 1. GENERAL INFORMATION the software to be tested. C. **References.** List applicable references, such as: 1. Project request (authorization). 3. Input-Output Files. Provide information for files A. Summary. Summarize the functions of the software c. Personnel. List the numbers and skill types of created or updated by the run, such as: and the tests to be performed. 2. Previously published documents on the project. • File name or label. B. Environment and Pretest Background. Sum-3. Documentation concerning related projects. • Recording medium. marize the history of the project. Identify the user 4. FIPS publications and other reference documents. • Retention schedule. organization and computer center where the testing such as multi-shift operation or key personnel. • Disposition of file. will be performed. Describe any prior testing and 4. Output Reports. For each output report or type of note results that may affect this testing. 2. OVERVIEW the test, such as: report, provide information, such as: A. Software Organization. Provide a diagram showing C. References. List applicable references, such as: • Documentation. • Report Identification. the inputs, outputs, data files, and sequence of opera-1. Project request (authorizations). • Software to be tested and its medium. • Medium. 2. Previously published documents on the project. tions of the software. Runs may be grouped by • Test inputs and sample outputs. • Volume of report. 3. Documentation concerning related projects. periods of time cycles, by organizational level where • Test control software and worksheets. 4. FIPS publications and other reference documents. they will be performed, or by other groupings. B. **Program Inventory.** Identify each program by title, • Number of copies. ſ • Distribution. T 2. PLAN 5. Reproduced Output Reports. For those reports number, and mnemonic reference. A. Software Description. Provide a chart and briefly C. File Inventory. Identify each permanent file that is that are computer-generated and then reproduced describe the inputs, outputs, and functions of the by other means, provide information such as: referenced, created, or updated by the system. Insoftware being tested as a frame of reference for the D. Testing (Identify Location). Describe the plan for • Report identification. clude the title, mnemonic reference, storage medium, test descriptions. • Reproduction technique. and required storage. B. Milestones. List the locations, milestone events, and in a manner similar to paragraph 2.c. • Dimensions of paper or other medium. dates for the testing. 3. SPECIFICATIONS AND EVALUATION • Binding method. £...) C. Testing (Identify Location). Identify the participat-C 3. DESCRIPTION OF RUNS • Distribution. A. Specifications. ing organizations and the location where the software A. Run Inventory. List the various runs possible and 6. Restart/Recovery Procedures. Describe proce-1. Requirements. List the functional requirements will be tested. summarize the purpose of each run. Show the produres to restart the run or recover from a failure. established by earlier documentation. 1. Schedule. Show the detailed schedule of dates and grams that are executed during each run. D. Run Description (Identify). Present information 2. Software Functions. List the detailed software events for the testing at this location. Such events B. Run Progression. Describe the manner in which about the second run in a manner similar to that used may include familiarization, training, data conprogression advances from one run to another so that 3. Test/Function Relationships. List the test to be in paragraph 3.C. version, and data report preparation. the entire run cycle is completed. 4. NON-ROUTINE PROCEDURES ł 2. Requirements. State the resource requirements, C. Run Description (Identify). Organize the informafunctions in paragraph 3.A.2. Provide any information necessary concerning including: tion on each run into the most useful presentation for 4. Test Progression. Describe the manner in which emergency or non-routine operations information, such a. Equipment. Show the expected period of use, the operating center and operations personnel intypes, and quantities of the equipment needed. as: volved. that the entire test cycle is completed. A. Switchover to a back-up system. b. Software. List other software that will be 1. Control Inputs. List the run stream control state-**B.** Methods and Constraints. B. Procedures for turnover to maintenance proneeded to support the testing that is not part of ments needed for the run. 1. Methodology. Describe the general method or grammers. 2. Operating Information. Provide information for 5. REMOTE OPERATIONS £ the operating center personnel and management, C such as: Describe the procedures for running the programs Run Identification. through remote terminals. Page 1 Page 1 36 0 37

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			Contraction of the local division of the loc
round	Page 1 1 1 1 1 1 1 1 1	 4. Test Progression B. Methods and Constraints Methodology Conditions Extent Data Recording Constraints C. Evaluation Criteria 	1 1 2 2 2 2 2 2 2 2
	1	 Data Reduction TEST DESCRIPTIONS A. Test (Identify) 	2 2
ATION	1 1 1 1 1 1	1. Control 2. Inputs 3. Outputs 4. Procedures B. Test (Identify)	2 2 2 2 2 2 2 2
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- personnel that are expected to be available during the test from both the user and the development groups. Include any special requirements
- 3. Testing Materials. List the materials needed for
- 4. Test Training. Describe or reference the plan for providing training in the use of the software being tested. Specify the types of training, personnel to be trained, and the training staff.
- the second location where the software will be tested
- functions to be exercised during the overall test.
- performed on the software and relate them to the
- progression is made from one test to another so

9. SAMPLE TEST PLAN DOCUMENT (continued)

strategy of the testing.

- Conditions. Specify the type of input to be used, such as live or test data as well as the volume and frequency of the input.
- 3. *Extent*. Indicate the extent of the testing, such as total or partial. Include any rationale for partial testing.
- 4. *Data Recording*. Discuss the method to be used for recording the data results and other information of the testing.
- 5. Constraints. Indicate anticipated limitations on the test due to test conditions, such as interfaces, equipment personnel, data bases.
- C. Evaluation.
- 1. Criteria. Describe the rules to be used to evaluate test results, such as range of data values used, combinations of input types used, maximum number of allowable interrupts or halts.
- 2. Data Reduction. Describe the techniques to be used for manipulating the test data into a form

suitable for evaluation, such as manual or automated to allow comparison of the results that should be produced to those that are produced. 5

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4. TEST DESCRIPTIONS

- A. Test (Identify). Describe the test to be performed.
 1. Control. Describe the test control, such as manual, semi-automatic, or automatic insertion of inputs, sequencing of operations, and recording of results.
- 2. *Inputs*. Describe the input data and input commands used during the test.
- Outputs. Describe the output data expected as a result of the test and any intermediate messages that may be produced.
 Procedures. Specify the step-by-step procedures
- 4. *Procedures*. Specify the step-by-step procedures to accomplish the test. Include test setup, initialization, steps, and termination.
- B. **Test (Identify).** Describe the second test in a manner similar to that used in paragraph 4.A.

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