Final Report

CRITERIA FOR CENTRALIZED CONTROL OF ARMY-WIDE MANAGEMENT INFORMATION SYSTEMS

Prepared for

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT VICE CHIEF OF STAFF
MANAGEMENT INFORMATION SYSTEMS DIRECTORATE

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Peat, Marwick, Livingston & Co.
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1. STUDY RESULTS

This report presents the results of a study to develop "Criteria for Centralized Control of Army-Wide Management Information Systems," performed by Peat, Marwick, Livingston & Co. (PML) under contract number DAHC 19-67-C-0052. The study was conducted on behalf of the Management Information Systems Directorate (MISD) within the Department of Army, Office of the Assistant Vice Chief of Staff, as part of a continuing effort to improve the management of information systems within the Army. The principal reasons for the study were the Army's growing dependence on accurate and timely information on which to base management decisions and the increasing cost and complexity of the systems that provide this information.

Approach

PML's initial work consisted of an analysis of the structure of Army Management Information Systems. This was followed by the development of techniques, criteria, and capabilities for the Army's use in more effectively managing and developing these systems. The major tasks performed were:

- description of Army management information structure;
- identification of resources and system elements whose management is vital to the success of all management information systems and improvement projects;
- definition of the management information system life cycle;
- design of a management control system to support the mission of the Management Information Systems Directorate;
- development of criteria and methodology for evaluating and controlling management information systems and improvement projects; and
- assistance to the Army in writing directives to promulgate policies and procedures for management information systems.

Problem Areas

Peat, Marwick, Livingston & Co.'s study of the management situation at MISD resulted in the identification of a number of basic problem areas. It is PML's belief that the Army's system management capabilities will improve as these problems and their causes are removed. In several instances, efforts have already begun to correct or improve the situations. The four major problem areas identified by PML are described in the following paragraphs.

MISD lacks the information and methodology needed to provide an overview of the Army Management Information System (AMIS) and to manage AMIS component systems. This in turn makes it impossible for MISD to be aware of the overall direction and costs of the systems for which it is responsible. This is true for both operations and development activities. The deficiency also lowers the quality of cost estimates and the ability of MISD to evaluate proposals for new systems.

Information system activities have not yet been related to the Army's Planning-Programming-Budgeting System. Their lack of financial visibility prevents the structuring of a funding base for information systems. The deficiencies of formal procedures and guidance aids hinder MISD in meeting the complex needs of funding individual development projects. Some of these projects lack the financial basis necessary for successful completion, but the deficiencies of procedures and guidance aids prevent the detection of this condition early in the project's life cycle.

Finally, there are no procedures for comparing the contributions of various information systems, for establishing requirements and resource priorities, or for broad planning beyond the immediate future. Because of this procedural void, the impact of proposed projects on existing systems and projects cannot be consistently assessed. Since the proposed projects are competing for resources, the inability to consistently assess their impact makes it impossible for MISD to allocate resources (e.g., programmers) efficiently. Furthermore, since project planning and control are not uniformly accomplished, adequate evaluation data is not available.

A second major problem faced by MISD is the lack of information and methodology needed to adequately evaluate

improvement proposals and manage improvement projects. The Army does not utilize a uniform approach in developing its management information systems. Specific developmental approval procedures have not been defined, and the guidelines that exist are oriented towards the justification of equipment acquisition. Therefore, individual projects do not have an adequate management approach to follow.

Proposals submitted to MISD in accordance with AR 18-2 are evaluated only through accompanying cost-benefit estimates. There is no meaningful basis for these judgments, and there is no verification or formal reporting of the cost-schedule-performance status of the projects. In addition, there is no methodology for comparing actual progress and costs with planning estimates or for detecting overruns or other problems before they are out of control. Furthermore, no mechanism exists to control the changes that inevitably occur during lengthy development efforts.

A third problem is that existing Army directives do not provide a comprehensive, consistent structure for management information system (MIS) policies, guidelines, procedures, and methodology conventions. Existing directives do not provide a uniform set of:

- policies stating goals and ground rules;
- procedures designed to achieve these goals and implementing policies; and
- standards, techniques, and conventions.

Versions of such a uniform set do exist among several Army organizations (e.g., Combat Developments Command and Army Materiel Command). However, many of the directives follow AR 18-2 by emphasizing automatic data processing equipment and do not address such areas as Guidance and Reporting System development. The directives do not fully cover or integrate the development of system performance specifications, computer programs, equipment, personnel, and other elements of the various information system types.

Because Army MIS projects do not have standard guidelines or procedures for organizing and managing system development, each project must develop its own. Often, too little effort is spent on project management.

Since Army management information systems have become increasingly complex, the requirement for a uniform set of directives is critically important.

The final problem faced by MISD is that there are not enough qualified personnel at HQDA and major commands to centrally support the Army's management information systems. This problem area is widely recognized within the Army and was brought into sharp focus by the SOMISS effort. The SOMISS effort also addressed the problems caused by the former organization of responsibilities, functions, and personnel resources within the Army. The SOMISS recommendations now being implemented will lead to an improved institutional framework for developing and managing MISs. The changes made will improve the environment for system management and coincide with the recommendations of this report.

Recommendations

Specific recommendations to alleviate the problems discussed are presented below in terms of three time-phased capability objectives: immediate, near-term, and long-term.

Recommendations for Immediate Action

As the first step toward improving Army management of its management information systems, Peat, Marwick, Livingston & Co. recommends that AR 18-xx be published. A draft of this AR is included as Appendix D. The recommended action is intended to remedy a number of the deficiencies in the current structure in the areas of approval, development, and operation of management information systems. It is also intended to contribute to a favorable environment for further development of the management capabilities of the Office of the Assistant Vice Chief of Staff. The proposed regulation would supersede the major part of Sections 1, 2, and 3 of AR 18-2, 27 September 1967. The remainder of AR 18-2 should then be republished separately to provide procedures for automatic data processing equipment acquisition and management. The recommended regulation includes the following features:

- introduction of the Guidance and Reporting System, standard application, and other concepts essential to the MIS management process;

- establishment of an approval and monitoring process, which extends throughout the life cycle of a management information system; and

- delegation of a major part of the approval and monitoring process to HQDA staff agencies and to major command headquarters agencies.

Recommendations for Near-Term Capabilities

Promulgation of AR 18-xx, in concert with the implementation of SOMISS recommendations, will provide the basis for an improved MISD management capability. The next step in improving Army management of its management information systems should extend and implement the design concepts applied during this study. The threefold objectives of the implementing taskwork would be:

- to enhance and extend life-cycle management procedures;

- to develop a comprehensive resource monitoring capability; and

- to develop a comprehensive systems management guideline.

Section VIII discusses these objectives in greater detail.

Recommendations for Long-Term Capabilities

The following sections of this report describe the study results and the management concepts and capabilities that are MISD's long-term objectives. To avoid becoming involved in a confusing sequence of tenses, Sections II through VII are written exclusively in the present tense. Section descriptions are given below.

- Section II discusses the Army Management Information System structure and defines this structure in terms of information flows and information processing systems.

- Section III details the life-cycle process of a management information system. The section includes a flow chart of system life-cycle activities and descriptions of each task involved.

- Section IV describes the objectives of and the approach to monitoring resource plans and expenditures.

- Section V provides several related project management concepts which PML believes the Army should apply to the development of information systems. These concepts involve the development environment, project reporting, configuration management, and system testing.

- Section VI contains descriptions of MISD activities as they would be performed in carrying out the organization's day-to-day management of information systems. These activities are supplemented by procedural checklists, which are given in the report's appendices.

- Section VII discusses the criteria and methodology needed to support MISD decision-making. The section covers the determination of criteria and their application to MISD operations.

II. MANAGEMENT INFORMATION SYSTEM STRUCTURE

Army Management Information System

When working with the aggregate of management information systems within the Army, it is useful to speak of them as the Army Management Information System (AMIS). This term does not imply the existence of a monolithic Army-wide information system. It is simply a conceptual framework within which individual management information systems exist. Such a classification scheme is useful in obtaining management control and direction over component information systems by identifying those elements and resources that are common to each system.

The Army Management Information System can be viewed in two ways. One view is functionally oriented and focuses on the flow of information from its basic source to the user. The information often passes through several organizational levels en route. This functionally oriented view encompasses guidance and the reporting of feedback which are typical of the communication process. The second view of AMIS is oriented toward the set of information processing systems serving the needs of a particular organization or group of organizations within the Army. The functional information flows are referred to as Guidance and Reporting Systems (G&RSs) by the Army, while the information processing systems are referred to as Operating Information Systems (OISs).

Figure II.1 shows the relationship between these two systems. As illustrated, a Guidance and Reporting System may be supported by one or more Operating Information Systems. Similarly, an Operating Information System may process information for one or more Guidance and Reporting Systems. Thus, the G&RS requirements of a given Army organizational element may be fulfilled by one or more Operating Information Systems. In its simple form, an OIS consists of one computer application, located at one data processing (DPI), supporting one G&RS.

Guidance and Reporting Systems (G&RSs)

The Guidance and Reporting System concept provides a way of depicting the complex information flows within the Army. A G&RS describes a cohesive flow of information from the source of data inputs to user products and services.

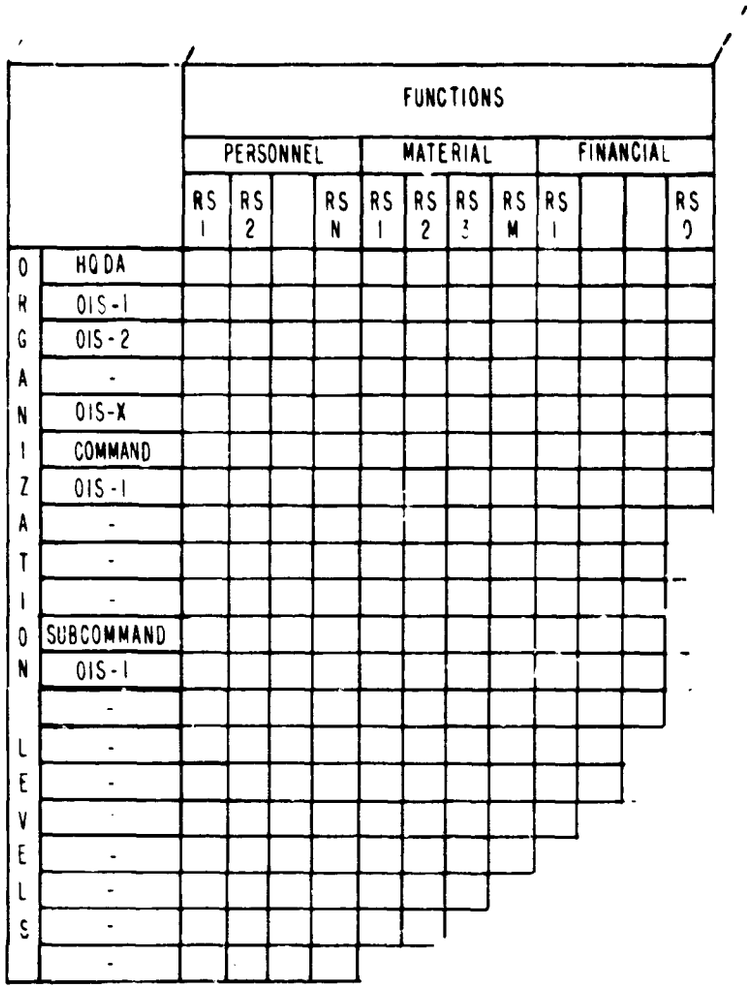


FIGURE II 1 —RELATIONSHIP BETWEEN GSRSs AND OISs

The requirement for this information flow is usually generated from the "top down," in the sense that new or modified reporting requirements are stated at upper levels (e.g., Headquarters, Department of the Army (HQDA) level, major command level) and levied upon lower levels.

A G&RS could be initiated with the Chief of Staff asking for Army personnel strength on a weekly basis, summarized by command/organization, grade, etc. To satisfy this request, the information must be collected at the lowest organizational level, summarized at each level up to major command or HQDA/agency, and then transmitted to the Chief of Staff in a report. This concept emphasizes the "top-down" coordination that complex systems require. Similar information requirements exist in all functional areas and vary from this simple illustration of collation and summarization to complex requirements that dictate sophisticated processing at intermediate levels.

Individually and collectively, the Guidance and Reporting Systems of the Army place various demands for information processing on organizational elements within the Army. These demands lead to the second view of AMIS: the Operating Information System Concept.

Operating Information Systems

Operating Information Systems are the actual information processing activities at a given organizational level of the Army. Typically, an OIS is a set of computer programs and procedures that satisfies the requirements of one or more Guidance and Reporting Systems. An OIS may range from a simple computer program at one DPI that sorts data and prints reports, to a sophisticated system like COCOAS, which supports G&RS in three major functional areas and will be operated at all Class II installations in USCONARC.

The OIS concept is important because Operating Information Systems are the units that are designed, implemented, and operated within AMIS to satisfy G&RS requirements.

III. LIFE-CYCLE MANAGEMENT

A fundamental concept in Peat, Marwick, Livingston & Co.'s approach to AMIS management is that all information systems should progress through a sequence of interrelated, but formally discrete tasks. This process is termed the system life cycle. The life cycle may be divided into three major segments: requirement definition, system development, and operation. Life-cycle management is the management of information systems through all three segments.

The purpose of life-cycle management is to assure that developed systems support the Army mission and that resources consumed in developing the systems are reasonable. The life-cycle management approach will give the Army increased confidence in management information systems by:

- establishing an improved means of specifying information requirements in order to better support management decisions throughout the life of the system;
- providing an apparatus for integrating and controlling the progression of events comprising the life cycle; and
- providing for an orderly incorporation of system changes, which are an essential part of all information processing systems.

Figure III.1 provides an overview of the major segments and tasks in the system life cycle.

Segment Descriptions

The major segments of the system life cycle are described in the following paragraphs.

Requirement Definition Segment

The requirement definition segment supports two different planning efforts within the Army. The first is the continuous Army-wide planning process that is part of the Army's Planning-Programming-Budgeting System. This effort provides the Management Information Systems Directorate (MISD) with the program and resource information needed to guide and monitor AMIS development. The second type of planning supported by the requirement

definition segment is that associated with individual G&RSs or OISs. This planning, which is discussed in detail later in the report, is the key to better control of system development because it establishes a progress measurement guide.

During requirement definition, information requirements are defined and new or modified Guidance and Reporting Systems are proposed. Priorities are then established for these proposals and resources are allocated. The end product of this segment is the definition of performance, cost, and schedule for each new G&RS or modification.

System Development Segment

In the system development segment, the Guidance and Reporting Systems previously defined are transformed into Operating Information Systems, which actually provide the required information. The development segment includes preparation of OIS specifications, the design, coding, and testing of computer programs, hardware selection and procurement, and many other tasks necessary to produce an Operating Information System. The end product of this segment is one or more Operating Information Systems that effectively satisfy the Guidance and Reporting System requirements at a reasonable cost.

Operation Segment

When the OIS becomes operational, a continual evaluation process begins. This evaluation measures the information provided by the system against individual user requirements. The result may involve refinement of the OIS, changes to the G&RS, or a major reworking of the AMIS structure to meet new requirements. Throughout this segment, changes to the system must be controlled, and adequate documentation must be maintained to support the continual changes and modifications inherent in such systems.

Task Descriptions

The tasks described below represent the major steps in developing information systems for the Army. The process outlined is not the only way to develop a system, but it is a proven approach to such an effort. The tasks identified should not be interpreted as the only important tasks in the system life cycle, but rather as points of departure

for developing the task descriptions for individual system projects. These tasks provide valuable bases for planning, controlling, and evaluating the system development process. The documents used to record the various tasks are also described, although emphasis is placed on the content and accomplishment of the tasks rather than on the documents.

The life cycle is illustrated in a flow chart (Figure III.2) at the end of this section. The numbered task descriptions correspond to the numbered blocks on the flow chart. The tasks and documents are the same as those illustrated in Figure III.1.

Requirement Definition Segment

1 - Identify Information Requirements. This is the initial recognition of an information requirement. The requirement may be for new information or for changes to information currently provided. It usually is identified in the upper echelons of the Army and requests information from subordinate organizations. Conversely, it is possible to have a request for information initiated at a lower level. The generation of an independent proposal or request for information requirements is also possible.

The initial information requirement is documented in a Reporting System Requirement (RSR), whose primary purpose is to describe the basic functions to be performed and the types of information needed to satisfy these functional requirements. A secondary purpose of the RSR is to allow a central agency in the Army to consolidate and review the various information requirements and to insure clarity and coordination between the information user and the system developer.

2 - Review and Evaluate RSRs. The responsible staff agency reviews and evaluates all RSRs related to a particular functional area. In addition, MISD receives copies of all RSRs. The purpose of this review and evaluation is to compare specific information requirements with Army goals and missions and to eliminate duplicate requirements. The staff agency submits its evaluation and recommendation for or against satisfying the requirement to MISD. MISD then prepares a Reporting System Directive (RSD) and sends it to the proponent of the RSR. The RSD directs the proponent to prepare a Guidance and Reporting System Specification (RSS) to specifically define the reporting requirements that must be satisfied. The purpose of the Reporting System Directive is to provide guidance to the proponent in defining the reporting requirements.

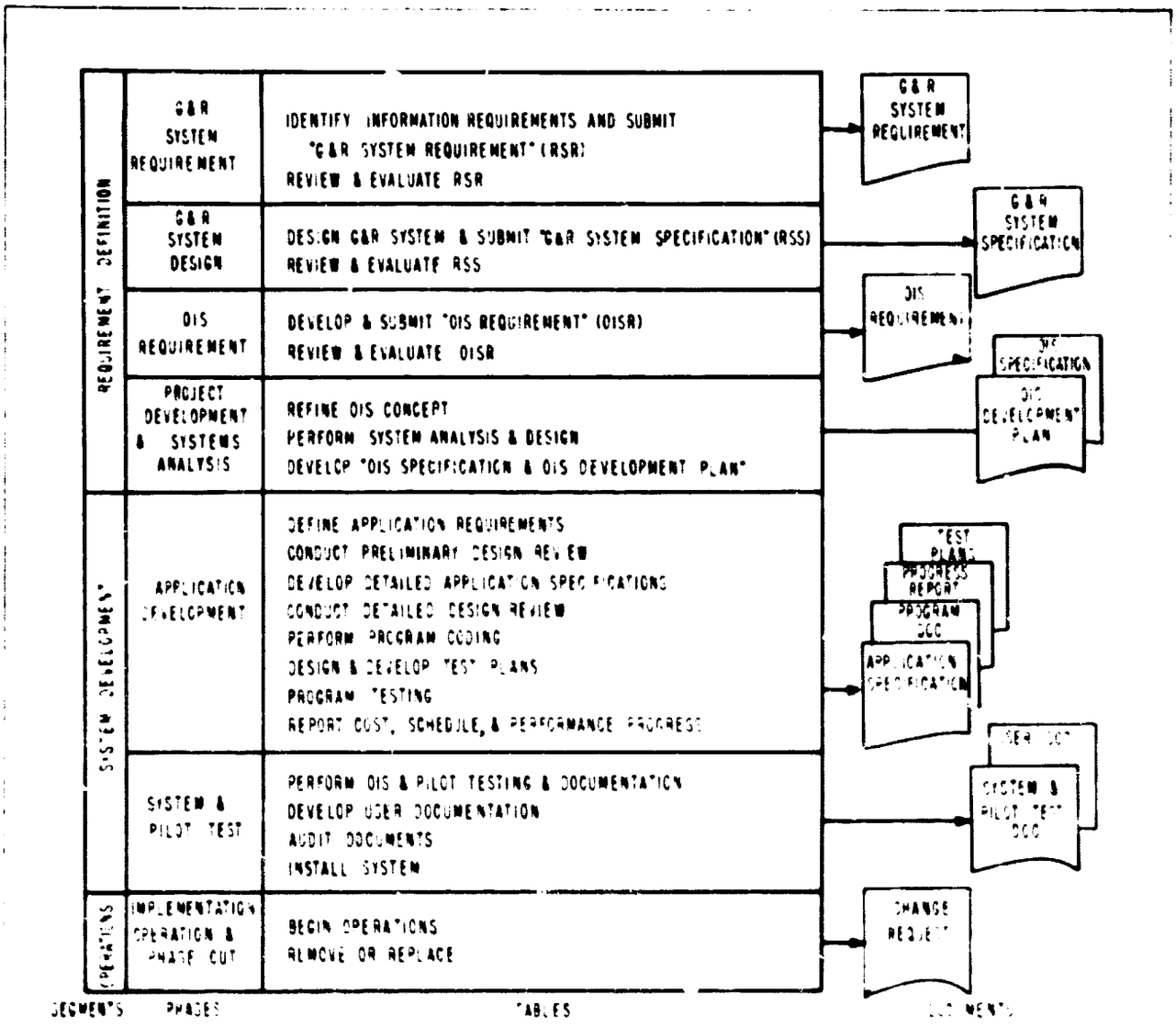


FIGURE III I — ARMY MIS LIFE CYCLE

3 - Design Guidance and Reporting System Specification (RSS). The originator of the requirement must prepare a detailed specification of the reporting system requirements in conjunction with the responsible staff agency. This specification (i.e., the RSS) is developed following the guidance given in the RSD and forms the basis for future development of data processing activities required to support the reporting system. The specification defines the flow of all information from the source, through data processing, to the user.

The Guidance and Reporting System Specification (RSS) is a formal documentation of the information flow within AMIS. The analysis required to produce the RSS must include studies of similar information requirements at various levels within the Army and within major commands.

4 - Review and Evaluate RSS. The RSS is reviewed and evaluated by the responsible staff agency, MISD, and other HQDA elements. This review is to ensure that a comprehensive specification of reporting system requirements has been prepared and that it presents sufficient information to support the decision-making process that follows.

5 - Identify Operating Information System Requirements. This task includes defining the basic requirement for an OIS, descriptions of the functions to be performed, identification of the reporting systems supported, identification of DPIs involved, and estimates of resource requirements. It is directed at an initial description of an individual OIS and is documented in an Operating Information System Requirement (OISR), which is used to justify the establishment or an Operating Information System Project Office.

6 - Review and Evaluate OISR. The responsible staff agencies review and evaluate all OISRs that support areas related to their functions. In addition, MISD receives information copies of all OISRs. The purpose of this review and evaluation is to compare specific OIS requirements with Army goals and missions and to eliminate duplicate requirements.

The staff agencies submit evaluations of and recommendations on the proposed OIS to MISD. MISD than prepares an Operating Information System Directive (OISD) and sends it to the originator of the OISR. The OISD directs the proponent to prepare an Operating Information System Development Plan and Operating Information System Specification to specifically define the requirements that must be satisfied. It also aids the proponent in preparing the documentation.

7 - Make Decision To Implement OIS. This is the first major decision point in the life-cycle process. It requires an answer on the question of committing Army resources to design the Operating Information System(s) necessary to support a particular G&RS. Before such a decision can be made, the Reporting System Specification(s) must be assessed in terms of the available resources, objectives, and missions of the Army or the command involved. Various alternative decisions are possible, ranging from approval, to rewriting, to disapproval of an individual RSS. If the Army decides to proceed with development, a monitoring agency to coordinate OIS development is designated.

The decision to implement an OIS generally arises from one of two major situations. The first situation that can lead to such a decision is the specification of one or more new or revised G&RSs that must be implemented. While this is the most frequent cause for generating OISs, the recognition that a new OIS is required to process existing G&RS more efficiently or economically can also result in a decision to implement an OIS.

8 - Analyze System. The system analysis task produces the performance, design, and test requirements for a specific OIS. This analysis involves determining the performance requirements in terms of the various resources of the system, (e.g., the equipment, computer programs, personnel, etc.). The product of this analysis is a system specification for the OIS, the Operating Information System Specification (OISS). The OISS identifies all performance/design requirements to be satisfied by the operating system. It describes each function that must be performed in terms of inputs, outputs, and processing requirements. The specification identifies the equipment, facilities, personnel, procedures, and other elements required by the system. In addition, it defines the baseline against which the OIS is designed and tested.

9 - Develop System Project Plan. A project plan to guide OIS development is prepared in parallel with the system analysis. This includes preparation of cost and schedule estimates for the system development phase. The plan contains a management structure for the project and descriptions of the specific tasks to be accomplished. Organizations responsible for performing these tasks must be identified. The Operating Information System Development Plan (OISDP) and the Operating Information System Specification (OISS) form the basis for the second major decision in the life-cycle process.

10 - Make Decision to Develop the Operating Information System. This is the last task in the requirement definition segment. It involves the acceptance or rejection of the OISDP and OISS by the MISD and HQDA staff and an agreement that the Operating Information System specified will satisfy the appropriate Guidance and Reporting Systems. The decision to proceed signifies the commitment of resources outlined in the plan to develop the OIS that is described in the specification.

System Development Segment

11 - Define Application Requirements. The individual application specifications are developed from the system specification. The specification for an application contains all the performance, design, and test requirements for an individual application. The specification also identifies and defines all the interfaces between the application and other applications and equipment. Once approved, the design specification will control the development of that application. Thus, the application is designed and qualified in accordance with its individual design specification.

12 - Conduct Preliminary Design Review. The Preliminary Design Review (PDR) is held to evaluate the design approach for the applications in light of the overall system requirements. Its prime objective is to ensure design integrity. A review of the interfaces affecting the application programs is an important element of a PDR. Emphasis is placed on verifying detailed interfaces with equipment and with other application programs. The programming features of the computer (e.g., interrupts, multiprocessing, time-sharing, etc.) must be known, and all external data formats and timing constraints must be identified. The computer program storage requirements and data base design are reviewed for technical adequacy at this time. The structure of the OIS is also reviewed.

13 - Prepare Detailed Application Specification. This effort involves the translation of the application design information into detailed flow charts, logic, etc., suitable for coding. The documentation of this effort forms the first element of the detailed specification for the application or computer program.

14 - Conduct Detailed Design Review. The Detailed Design Review (DDR) is a formal, technical review of the design of the application programs at the detailed flow chart level. It is held to establish the integrity of the program design prior to coding and testing. In the case of a complex application

program, a DDR is held for each component as its design proceeds to the detailed flow chart level. At the DDR, the completed sections of the application's detailed technical description are reviewed along with supporting analytical data, test data, etc. The compatibility of the program design with the requirements of the application specification is established at the DDR. Design integrity is established by reviewing analytical and test data in the form of logic design, algorithms, storage allocations, and associated methodology.

In general, the primary product of the DDR is the establishment of system design and development, which are the technical bases for the continuation of the program development cycle. Immediately following the Detailed Design Review, the individual components are coded, and the process of checkout and testing the components begins.

15 - Code Programs. This effort involves converting the detailed design into usable computer programs. The output is a set of instructions (e.g., cards, magnetic tape, etc.) documented by annotated program listings. Preparing the initial tests required to assure an operable computer program is also part of this effort. This task provides the final element of the detailed application specifications that document the activities of blocks 12, 13, 14, and 15.

16 - Develop System Test Approach. The purpose of test planning is to develop a comprehensive approach to qualification tests, system tests, and pilot testing of the system. This approach must be complete with schedules, test methods, and criteria; identification of simulated versus live inputs; and support requirements for test equipment, facilties, special test computer programs, and personnel. The resulting system test plan forms the basis for test procedures prepared later to describe individual tests in detailed terms, specifying objectives, inputs, events, recording/data reduction requirements, and expected results. The system test plan is essential to the development effort since it identifies the tasks related to testing and defines responsibilities for accomplishing those tasks.

17 - Design Tests. The detailed design of system tests to complement the system test plan is accomplished in parallel with the detailed application design. The test program developed generally is a series of tests that vary in scope from tests of individual components to total system tests. For each series of tests, detailed testing procedures

are developed that identify the test objectives, resources, expected results, specific actions to be taken, and so forth. These test procedures are used as guides in conducting the individual tests of the system.

18 - Test Programs. When individual components of the program are coded, they are tested in accordance with previously developed procedures. The testing is conducted in a modular fashion, starting with small components and adding modules until the whole system has been tested. Individual system elements are tested to ensure that the system meets its design specification and is ready for system level tests.

19 - Conduct System/Pilot Tests. When all elements of the system are qualified, system level tests begin. These tests are conducted to ensure that the elements work together to satisfy the requirements in the system specification. The system tests duplicate, as far as possible, real system operating conditions. During the pilot test, real data is processed by the system to show that the system satisfies the specification under operating conditions.

20 - Develop User Documentation. Various user-oriented documents are prepared in conjunction with the detailed design and development of computer programs. These documents extract information concerning the operation and use of the system from the technical documentation previously developed. The documentation is structured and written expressly for the individual types or groups of people using or operating the system. Drafts of these documents are available for the system and pilot tests so that their effectiveness can be evaluated.

21 - Audit Documents. When the design and testing of the computer programs is essentially completed, the detail specification is made available for review. The detail specifications provide a complete and detailed technical description of the computer programs "as built," and function as the primary document for use by programmers in correcting errors in and designing changes to the computer programs. The technical accuracy and completeness of the specifications are determined prior to acceptance of the document by the Army. The document audit is the vehicle for the required review of the detail specification and is an audit of the specification and the computer programs as delivered. The primary product of the review is formal acceptance by the Army of the specification as an audited and approved document.

Acceptance of the computer programs for pilot testing is based on the successful completion of the system test program and the audit, but it does not relieve the developer of meeting the requirements of the system specification. Subsequent to the review, the configuration of the computer program is essentially controlled at the machine instruction level so that the exact configuration is available for pilot testing.

22 - Install System. After a successful pilot test, the system is installed at operational sites. This effort includes site and facility preparation, equipment installation, computer program installation, and implementation testing. These tests are designed to ensure that subsequent sites are identical to the pilot installation. This represents the end point of the system development segment.

Operation Segment

23 - Begin Operations. The system is now operational and performing its intended mission.

24 - Remove or Replace System. Eventually the system is deleted from the Army inventory. To accomplish this, a number of tasks are performed. Disposition of equipment and relocation of personnel require careful consideration.

Responsibilities

Individual responsibilities for life-cycle management are described in the following paragraphs.

Management Information Systems Directorate (MISD)

The Management Information Systems Directorate is responsible for overall guidance and coordination of systems throughout the system life cycle. MISD's role is to ensure that the total Army Management Information System (AMIS) satisfies Army mission requirements. Specific MISD responsibilities are:

- to review and approve the development of system specifications and assign responsibility for their development to an appropriate HQDA staff agency;
- to review and approve OIS requirements and development proposals and assign a monitoring agency (MA) within the HQDA staff; and

- to maintain continuing surveillance over all information system projects by means of periodic progress reporting and liaison with the assigned MA.

HQDA Staff Agencies

Each HQDA staff agency is responsible for the development of all assigned Guidance and Reporting Systems and for monitoring all the functional areas (e.g., personnel, finance, logistics, etc.) of each system. Specifically, each HQDA staff agency:

- identifies and defines the information needs of management in HQDA in the appropriate functional area and defines G&RSs and OISs to meet those needs;

- prepares detailed specifications for G&RSs when such systems supply information to HQDA;

- monitors the development and operation of the functional components of Operating Information Systems to ensure that they fully satisfy the specifications of the Guidance and Reporting Systems they support; and

- acts as an MA (when so directed by MISD) to oversee all development activity and ensure that the system design meets management requirements within established time and cost constraints.

Responsibility for OIS Development

During the life cycle of an Operating Information System or system development project, several management and technical responsibilities are undertaken. Among those who assume these responsibilities are:

- monitoring agencies (MAs) - HQDA staff agencies appointed by MISD to take responsibility for approving and monitoring the development and operations of Operating Information Systems. For OISs that are confined to single functional areas, a HQDA staff agency having expertise in that functional area is designated by MISD as MA. If OISs and OIS development projects support particular G&RSs, the MA is the HQDA

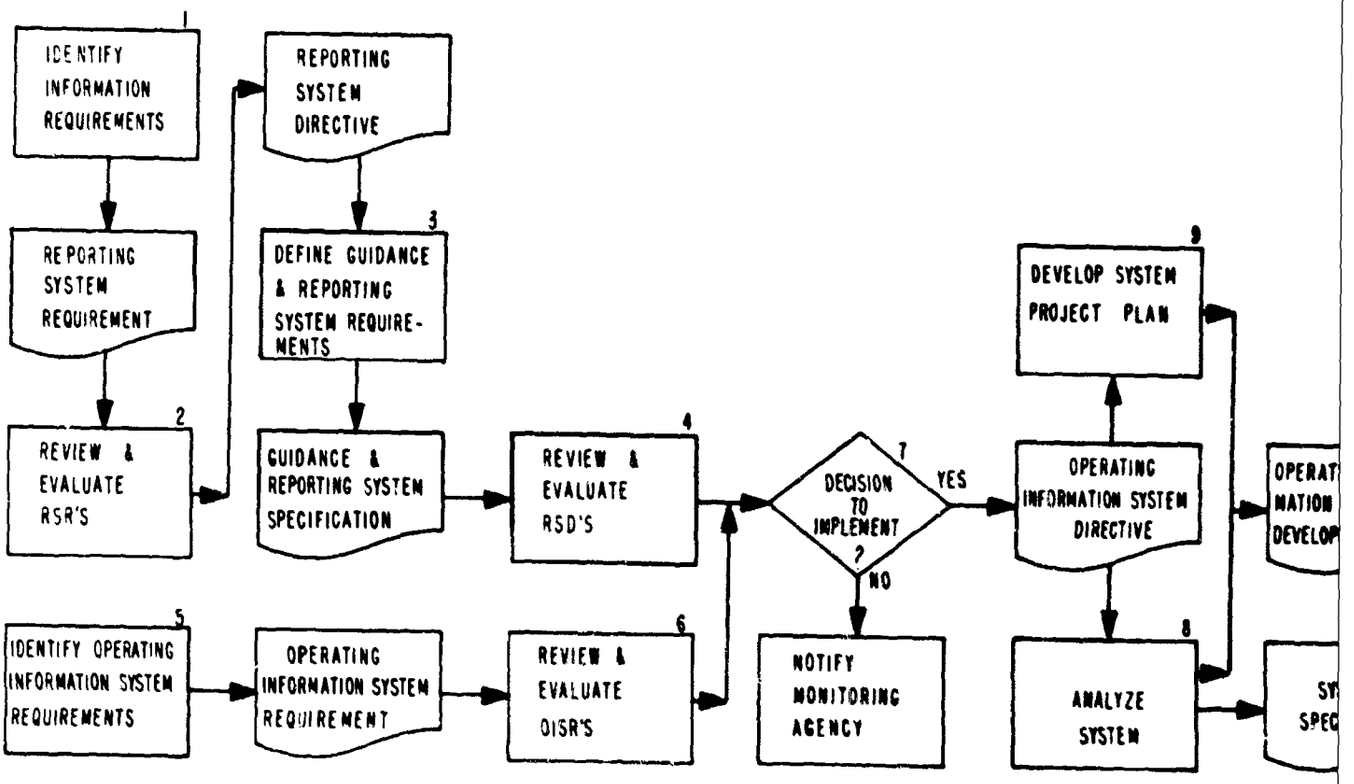
staff agency or other HQDA agency responsible for design and development of the system. If OISs and OIS development projects extend across two or more functional areas, MISD assumes the role of MA;

- responsible development agencies (RDAs) - organizations responsible for design and development of OISs. They are specifically responsible for the design and development of OIS programs and procedures. RDAs are usually Army major commands designated by MISD; and

- project managers (PMs) - individuals designated by appropriate authority who are responsible for managing an improvement project. In the case of an OIS development project, the PM is designated by the RDA.

REQUIREMENT DEFINITION SEGMENT

SYSTEM RE



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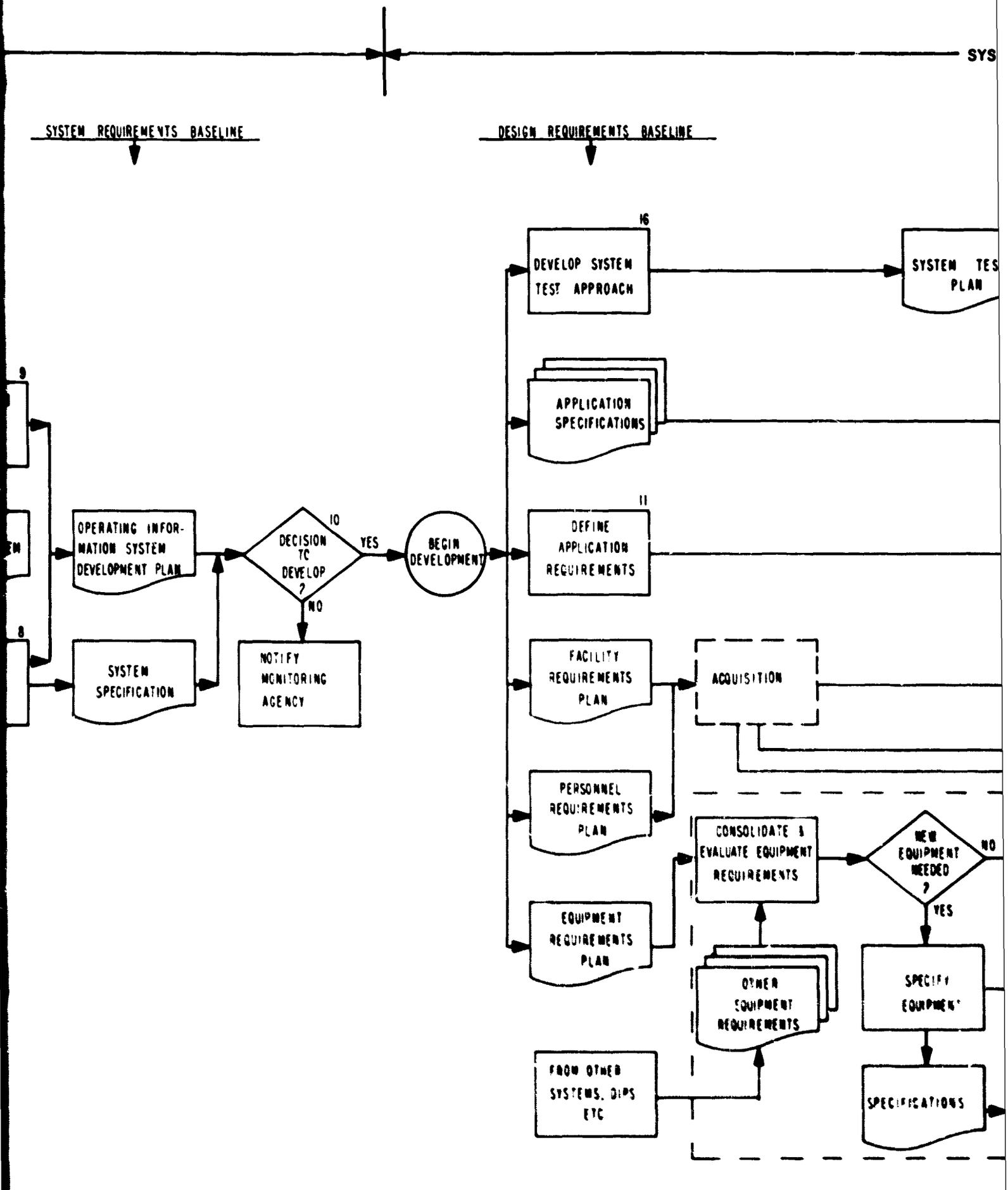

SYSTEM REQUIREMENTS BASELINE
DESIGN REQUIREMENTS BASELINE
16
DEVELOP SYSTEM TEST APPROACH
SYSTEM TES PLAN
9
APPLICATION SPECIFICATIONS
11
DEFINE APPLICATION REQUIREMENTS
OPERATING INFOR-MATION SYSTEM DEVELOPMENT PLAN
10
DECISION TC DEVELOP ?
YES
NO
BEGIN DEVELOPMENT
8
SYSTEM SPECIFICATION
NOTIFY MONITORING AGENCY
FACILITY REQUIREMENTS PLAN
ACQUISITION
PERSONNEL REQUIREMENTS PLAN
CONSOLIDATE & EVALUATE EQUIPMENT REQUIREMENTS
NEW EQUIPMENT NEEDED ?
NO
YES
EQUIPMENT REQUIREMENTS PLAN
OTHER EQUIPMENT REQUIREMENTS
SPECIFY EQUIPMENT
FROM OTHER SYSTEMS, DIPS ETC
SPECIFICATIONS

B.

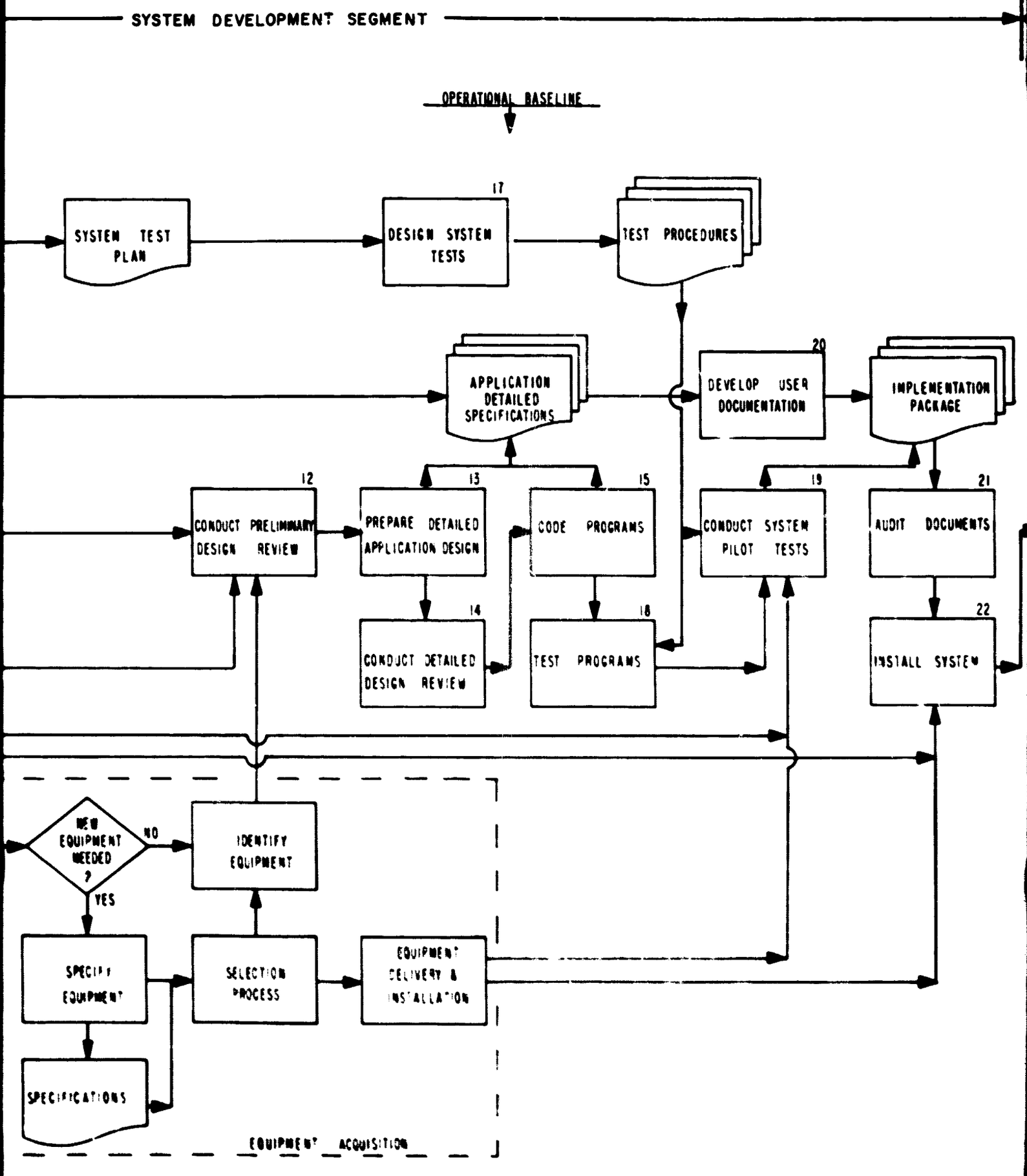
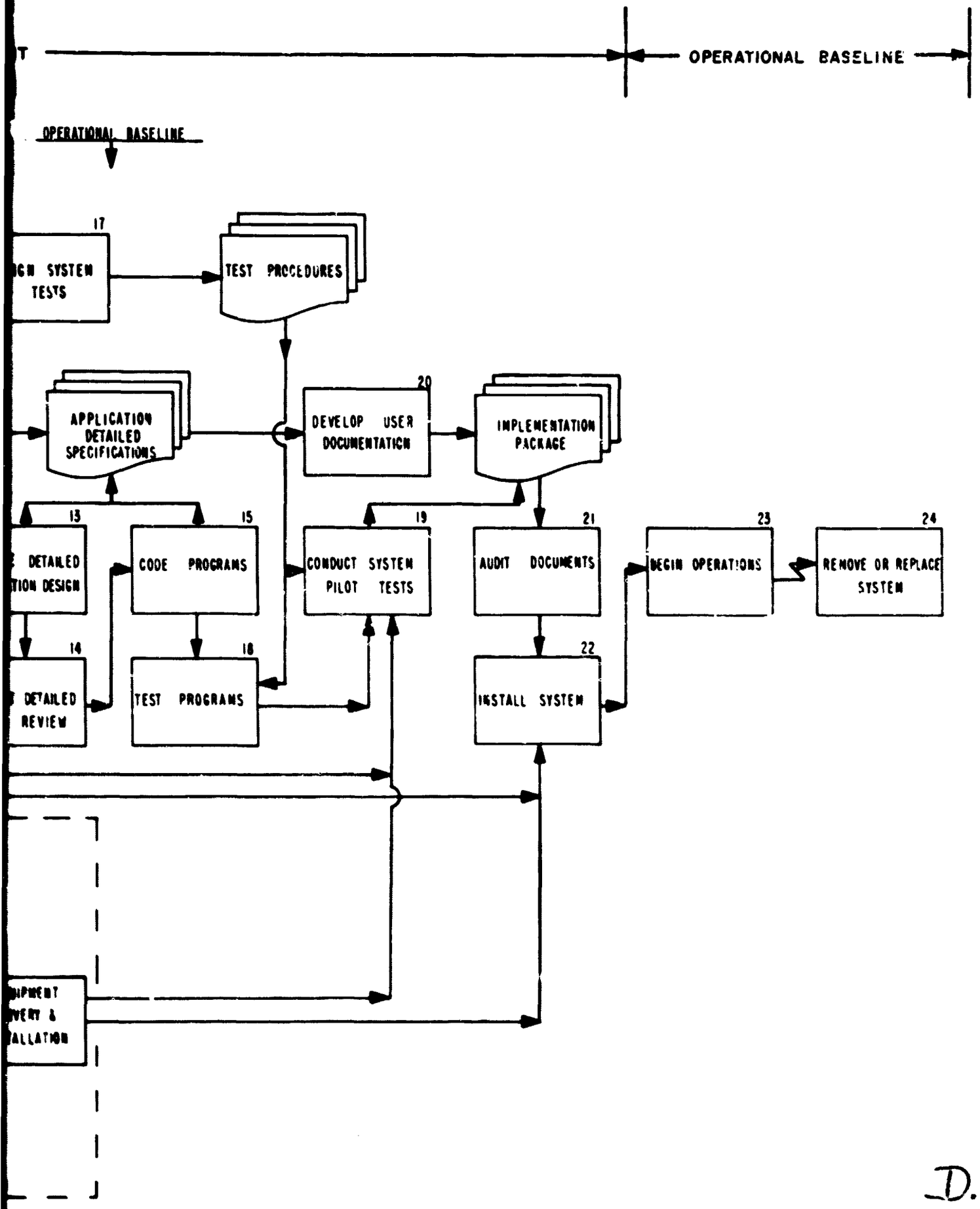


FIGURE III 2 — INFORMATION SYST



D.

FIGURE III 2 — INFORMATION SYSTEM LIFE-CYCLE PROCESS

IV. RESOURCE MONITORING

The overall objective of resource monitoring is to supply the Army with tools to analyze and evaluate resource expenditures for information systems. These tools provide the Army with the financial visibility necessary to support decision-making throughout the life of the information systems. Specific objectives of the resource monitoring procedures are:

- to provide improved visibility of information systems in the Department of the Army budget;
- to collect actual resource consumption data for system development and operation;
- to provide an improved basis for Army resource allocation during system development and operations; and
- to provide the Army with the means to establish financial control over the development and operation of these systems.

The monitoring of resource expenditures has two distinct functions, planning and control. The planning function begins early in the system life cycle and consists of developing comprehensive, carefully considered project plans in the areas of cost, project scheduling, and system performance. These plans define baselines against which progress is measured and against which the impact of proposed changes on project plans is assessed. The control function consists of comparing actual progress with these plans and taking appropriate action, e.g., changes to assure completion of a project within the constraints of schedule, cost, and performance. Both functions continue throughout the life cycle.

Approach

In general, resource information is given in terms of either estimated or actual resource expenditures. The collection of these two types of resource information (i.e., estimated and actual) during each of the three system life-cycle segments is discussed in detail below.

Requirement Definition Segment

A proposed reporting system is defined early in the requirement definition segment. Estimates of the resources required to implement such a system are also given. This information includes gross estimates for the cost of renting or purchasing automatic data processing equipment (ADPE), of contractual support and other expenses, and of the personnel requirements in terms of military and civilian man-years. The information is compiled for the current fiscal year and the five following fiscal years; it is prepared by the proponent of the new reporting system. If the system is to be implemented at more than one major organizational level within the Army, estimates are developed for each organizational level involved. The information is formally prepared as part of a Reporting System Requirement (RSR) or a Reporting System Specification (RSS). In addition, if a major change to the Army budget or the Five-Year Defense Plan (FYDP) is required, a Program Change Proposal is prepared for review and analysis by MISD and the Army staff.

The next major task is the definition of the Operating Information Systems required to implement one or more reporting systems. This definition is prepared by the operating system design agency. An essential part of such a definition is an estimate of the resources required for development and operation of the Operating Information Systems.

System Development Segment

The resource information for the system development segment is of the same form as that for the requirement definition segment, but the estimates are more accurate and are supported by in-depth analysis and detailed resource estimates. The information is again compiled for the current fiscal year and the five following years. It is also compiled by Army organizational level if applicable. In addition, an OIS that supports more than one reporting system allocates the total development costs to the reporting systems involved to arrive at the development cost of an individual reporting system.

The collection of actual resource expenditures is complicated by the manner in which systems are developed. System projects permit the collection of resource expenditure data through the Army accounting system. Systems not assigned to specific projects and developed through OPI resources require separate reporting procedures to

gather resource expenditure data. The best way to collect these data appears to be through an expansion of the existing ADPE system (IAW AR 18-3). This results in what is essentially a man-hour accounting system for those engaged in operation of information system and in development of new information systems. If the amount of the system development work conducted by individual DPIs becomes negligible, this information is no longer required.

Operation Segment

Resource information for the operation of the systems includes identification of the personnel required to operate and support the system and of equipment rental costs incurred in op rating the system. Any other unusual cost of operations (e.g., for unique consumables purchases) is also identified.

The initial estimates for resources required to operate new OISs are made during the development phase by the operating system design agencies. Estimates for continuing operations are made by individual DPIs and assembled as DPI operating budgets. This information is displayed on an OIS basis and is summarized to show the total cost of DPI operations.

The cost of operating an individual DPI is collected and reported through the Army accounting system for comparison with the budgetary figures. Collection of resources on an individual OIS basis may be through an extension of the existing Controller of the Army (COA) ADPE reporting system. This provides actual resource expenditure information for operating systems and individual reporting systems where possible. To ensure accuracy, the information collected through the ADPE reporting system is reconciled with that collected through the accounting system at the end of a reporting period.

V. RELATED PROJECT MANAGEMENT CONCEPTS

To achieve the management capabilities represented by the life-cycle concepts and resource monitoring requirements, a number of related tools, which involve the manner in which development activities are organized and controlled, are required. These tools are project reporting, configuration management, and system testing.

Assumptions

Before explaining the tools referred to above, several Peat, Marwick, Livingston & Co. assumptions about system developmental environment must be understood. These assumptions involve three areas:

- how efforts to improve systems are organized (project organization);
- how development resources are controlled (resource control); and
- how development methodology is adapted to the size and complexity of the systems being developed (system size/scope).

PML feels these areas are key elements to understanding and improving MISD capabilities.

Project Organization

PML expects a project management type of organization to be used for the development of Operating Information Systems. This type of management implies that an individual project manager has specific responsibilities and commensurate authority for development of individual systems. This project manager is responsible for meeting stated performance requirements within the schedule and cost constraints of an individual OIS. He must make effective use of the resources at his disposal within the confines of three parameters: time, cost, and performance.

The project management concept uses the team approach to designing and developing a system. Functional experts work with the system user under the direction of the project manager. Detailed plans are developed for cost, schedule, and performance of the project, and these plans guide the project office in achieving the objective, i.e., an Operating Information System.

The project organization may take several forms, depending upon the scope and nature of the work and the life-cycle phase. The need for clearly defined project responsibilities can be seen by examining the following possible organization structures:

- an aggregated organization, in which all personnel and other project resources are under the direct supervision of the project manager;

- a mixed organization, in which some important developmental functions (e.g., facility construction) are not under the direct supervision of the project manager, even though he has coordination responsibilities for these functions. Remaining development and staff functions do report to the project manager;

- a staff organization, in which the project manager directly exercises control of all resources committed to project-unique functions (e.g., planning, task and financial management, configuration and change control, or site activation), but does not control primary functional tasks usually performed by HQDA staff agencies or commands (e.g., engineering, procurement, and facility construction). Again, administrative and coordination responsibilities remain with the project manager; and

- an individual project consisting of only the project manager and required administrative staff personnel, in which all project control is exercised via HQDA staff agencies or commands.

Resource Control

In the resource utilization area, it is assumed that whether the resources come from a contractor, a programming pool, or an individual project office, the personnel involved are responsible to the project manager for the accomplishment of tasks related to project development. The project manager must have control of and responsibility for all the resources expended on his project to most effectively perform his managerial duties.

System Size/Scope

At the present time, the Army Management Information System is undergoing a transition from a large number of relatively small systems to a smaller group of larger, more sophisticated systems (e.g., COCOAS). Informed sources expect more sophisticated systems, which satisfy wider functional areas, will be built in the future, and that the smaller systems will eventually be deleted from the inventory. The development methodology recommended for use by MISD is primarily aimed at the larger systems. However, it is adaptable for use on less complex projects. The tools for this development methodology are explained in the remainder of this section, and supplemental information appears in Appendix B.

Development Methodology Tools

Project Reporting

Project reporting is designed to meet the basic information requirements for management of OIS projects. The data provided by project reporting also support the monitoring of all development efforts by MISD. Project reporting involves a hierarchy of reports which vary in levels of detail. Examples of a report hierarchy are described in Appendix B. The project reporting approach permits an adaptation of an OIS to the demands of any project.

Operating Concept

The operating concept for project management reporting is portrayed in flow chart form in Figure V.1. This chart illustrates how data inputs are received, how the information is processed, and how the output reports are distributed. Individual responsibility for preparation of the project management reports rests with the project office. MISD is responsible for the preparation and distribution of the summary reports.

Data Inputs

The initial data inputs are taken from the documentation used for approval of the project, e.g., the Operating Information System Development Plan (OISDP). These include the work breakdown structure (WBS), the time-phased budget plan, the implementation schedules, and clearly defined responsibilities for the various project tasks at the

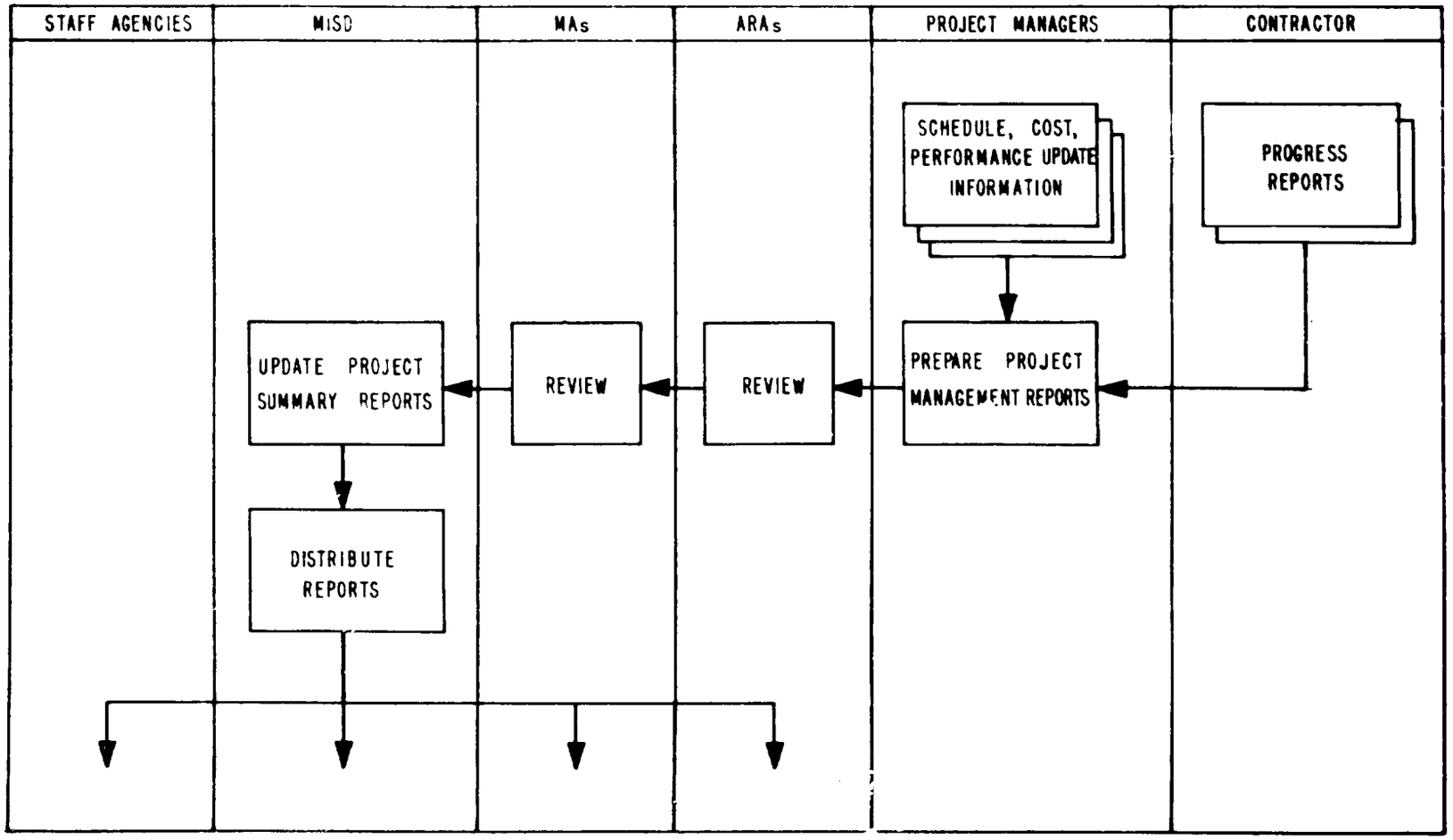


FIGURE V.1 —PROJECT MANAGEMENT REPORTING PROCESS

government and contractor levels. The data forms the cost, schedule, and performance baselines to which actual progress is subsequently compared.

Configuration Management

Configuration management is a second management technique that aids in project control. This technique establishes procedures for controlling the performance requirements and the actual configurations of the various parts of a system and their associated documentation. Contrary to a prevalent misconception, configuration management is not synonymous with, nor a substitute for, the technical system engineering/analysis effort that is the heart of system design and development. However, it is closely related to other areas of systems management, particularly with the processes of system engineering and testing. Configuration management applies to items of computer programs, equipment, and facilities, which are identified as the major elements of an Operating Information System.

Within the scope of configuration management, distinction is made between the three major sub-processes of identification, control, and accounting.

Configuration identification refers to the technical definition of the system and its parts. Primarily, this definition takes the form of specifications. In general, configuration management is based on the concept of uniform specifications, which implies that in each system project there should be one general specification for the system as a whole and one specification for each major element. General format and content requirements of the specifications are uniform for all systems. Detailed requirements for specification format and contents are different for the major elements (e.g., equipment, facilities, and computer programs).

Once written and approved, each specification formally defines a baseline for the system or element. A baseline is an established and approved configuration, constituting an explicitly defined point of departure from which changes can be proposed, evaluated, and implemented. The baseline evolves as the system progresses through the life cycle and as changes are required. The importance of the baseline concept is that it provides an organized structure from which to evaluate and understand the changes.

Configuration control refers to the procedures by which changes to baselines are proposed, formally processed, and approved. These procedures involve standard classes and types of change proposals, as well as formal mechanisms for review, evaluation, approval, and authorization for implementing the proposed changes.

Configuration accounting refers to the reporting and documenting activities involved in knowing the status of various system baselines at all times during the system life cycle. For Operating Information Systems, it is principally a matter of maintaining a record of and reporting the status of specifications, associated documents, and proposed changes.

Configuration Management Documentation and Procedures

While the purpose of configuration management is to control system elements (as distinguished from data or services), the management process itself is principally a matter of accomplishing documentation and establishing procedures. As indicated above, technical specifications are the principal substance of the configuration identification process. Configuration control and accounting are accomplished by means of standard forms and reports. Account must also be taken of technical manuals and other documents prepared for the using organization, because their contents are sensitive to changes in computer program configuration. This is particularly true in the case of complex information systems.

Hence, configuration management and its sub-processes can be represented as a structure of principal documents and the standard procedures associated with those documents. This structure is illustrated in Figure V.2, which shows:

- the specifications - which are the baselines that are defined and managed;
- the dependent procedural data - in the form of handbooks or manuals; and
- the set of forms and reports - which serve as tools for control and accounting.

Events are related in a general way to phases of the system life cycle. Configuration management begins during the requirement definition segment with issuance of the

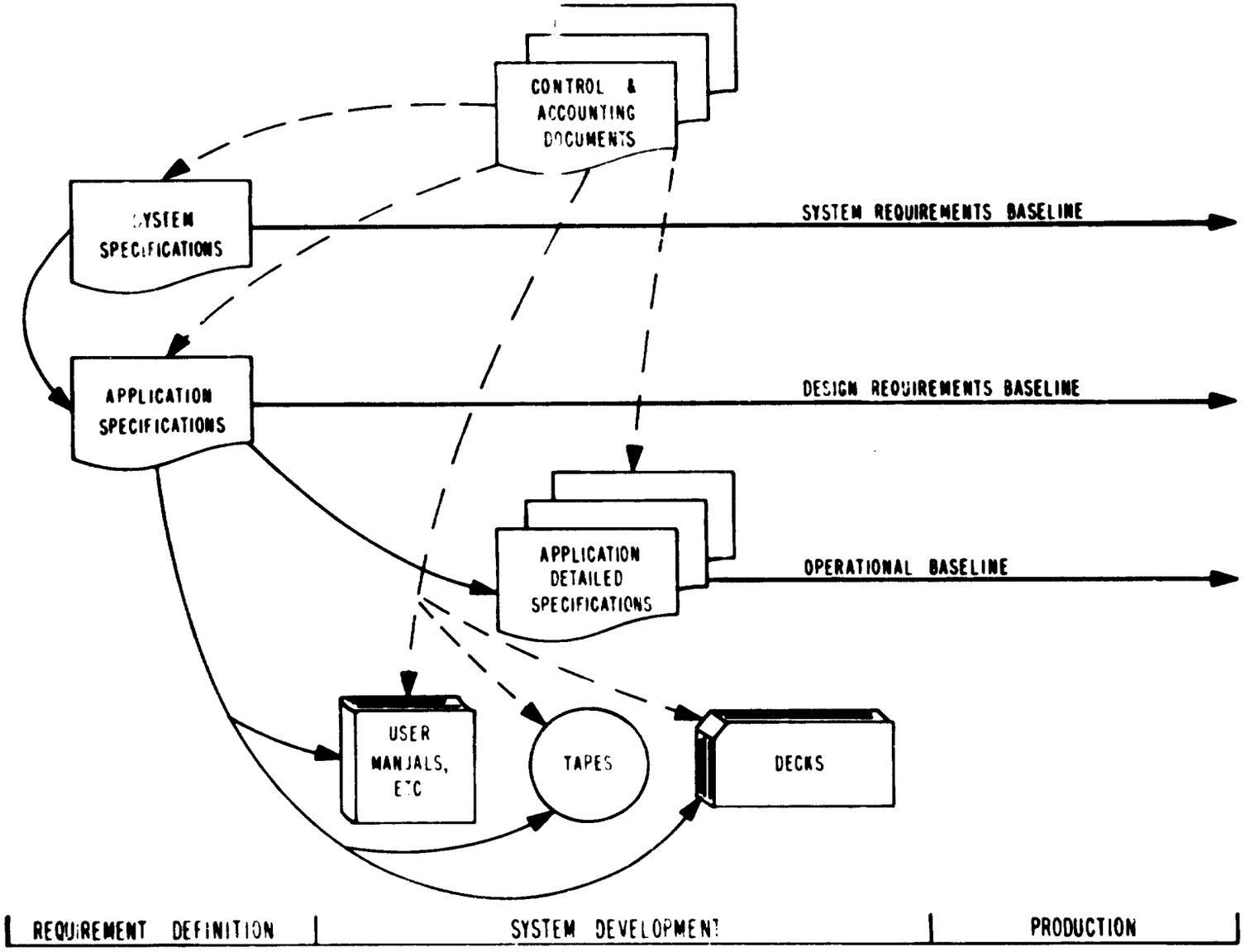


FIGURE V.2 —BASELINE MANAGEMENT

Operating Information System Specification and expands during the system development segment; it is maintained throughout the system's operational life.

Three baselines are established at successive times during development. However, an earlier baseline is not replaced by a later one, because each serves a different function. Once established, all are maintained until the system is deleted from the inventory. The three baselines are shown in the system life-cycle flow chart in Section III.

System Testing

Information system tests are divided into three classes: qualification tests, system tests, and pilot tests. These tests are necessary to ensure that the system will meet its requirements when it is actually implemented.

Qualification Tests

The qualification test is used to check the computer program's satisfaction of the design/performance requirements of the "design to" specification. The test must ensure that all the system's functional requirements have been translated into computer program components. The qualification testing program is divided into two major classes of tests: preliminary qualification tests (PQT) and formal qualification tests (FQT).

Preliminary Qualification Testing. Preliminary qualification tests are designed to verify the performance of individual components prior to an integrated formal qualification of the complete computer program. Even though the tests are preliminary in nature, they provide check points for monitoring the designer's progress towards meeting design objectives and for verifying detailed performance characteristics which, because of sheer numbers and complexity, may not be feasible to verify in their entirety during formal qualification testing. The PQT phase is conducted incrementally by components in the same manner as the Detailed Design Review (DDR). Figure V.3 depicts the relationship between the DDR and the test program. The cross-hatched blocks in Figure V.3 indicate coding of individual computer program components. The preliminary qualification tests are modular, and a "building block" effect occurs as testing progresses.

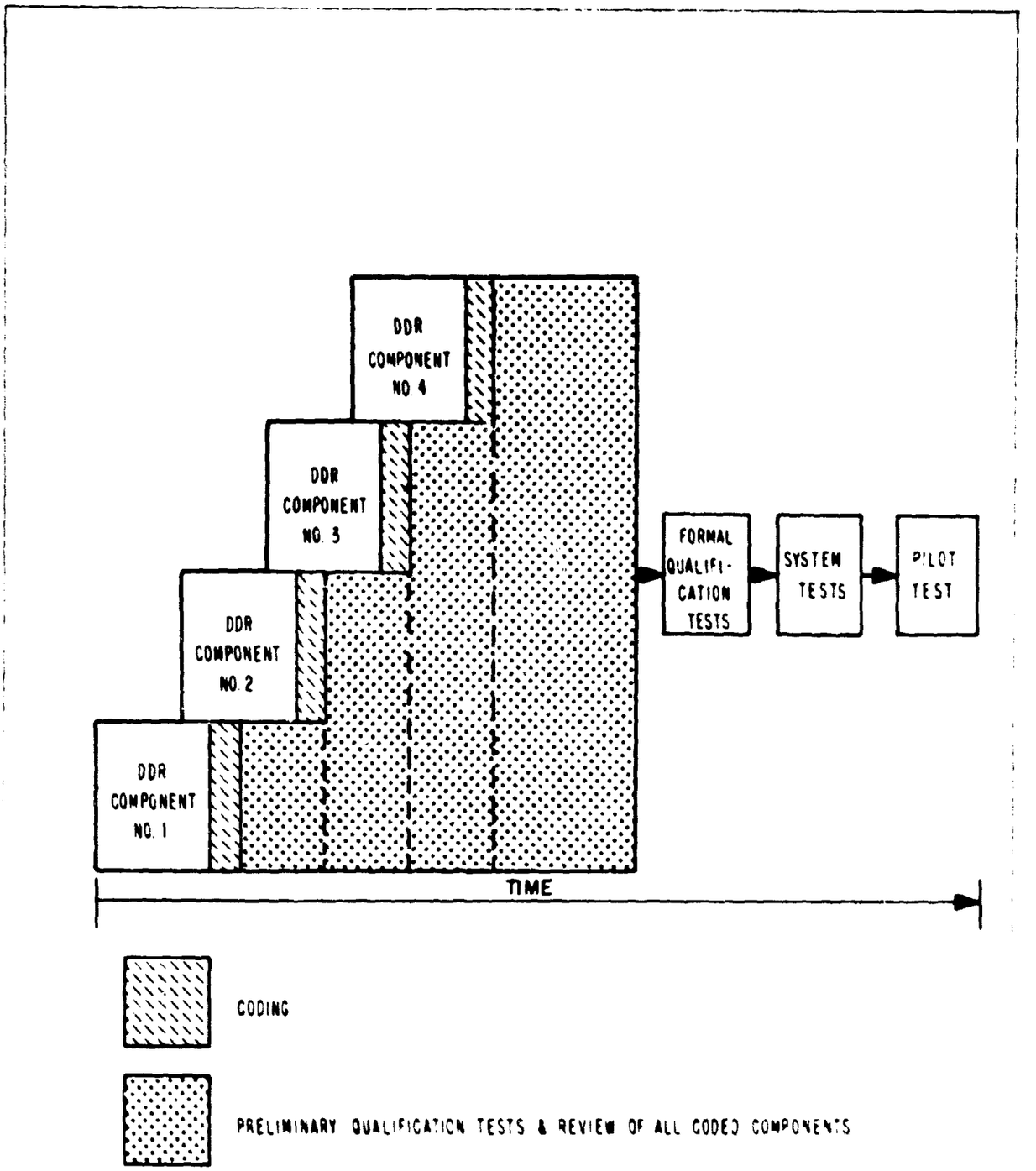


FIGURE V 3 — COMPUTER PROGRAM DETAILED DESIGN REVIEW (DDR) & SYSTEM TESTING

Formal Qualification Testing. Formal qualification tests are similar to the PQTs conducted on program components. They differ in that the FQTs test complete application programs prior to the start of system testing, while PQTs test only individual components. The FQT represents the formal qualification of a computer program. These tests illustrate the application program's satisfaction of the application specification requirements.

System Tests

System tests are performed to demonstrate that all the system elements function together to satisfy the performance requirements given in the system specification. Generally, system tests are designed to evaluate all five elements of the system (i.e., computer programs, equipment, facilities, personnel, and procedural data). These tests usually progress from subsystem tests to system tests and are conducted by the Army in an environment that is as near the expected operational environment as possible.

Pilot Tests

The pilot test is a test of the whole system in an actual operational environment. It is used to determine whether the system satisfies the information requirements under real operating conditions with actual operating personnel. The pilot test is the final evaluation of the system before it becomes operational.

VI. MISD ACTIVITIES

This section explains how MISD's internal operations are accomplished using the information and techniques described in the preceding sections. The operations are presented in terms of the functional activities that make up the day-to-day management of AMIS and its components. These activities already exist in some form within the present MISD organization, although the organization is not specifically structured according to the activities described herein. The existence of these activities permits the recommended capabilities to be developed within the practical limitations of available resources and to be implemented incrementally.

Procedural Activities

MISD's activities are related to the major segments of a system's life cycle in Figure VI.1. This grouping also reflects the changing nature of systems. As indicated in Figure VI.1, MISD planning is a root activity that is basic to all subsequent life-cycle segments.

The MISD procedural activities listed in Figure VI.1 accomplish the major functions of the Management Information Systems Directorate. These functions are necessary to enable MISD to achieve its objectives, which are:

- to develop overall AMIS goals and plans;
- to review and evaluate MIS requirements and improvement plans;
- to guide MIS improvement projects;
- to monitor MIS operations;
- to provide guidance on ADPE requirements;
- to promote the use of standards; and
- to promote the use of improved MIS management practices.

A system existing in the form of a requirement differs from the same system in the development stage. This system usually is altered again when it becomes operational. The differences are reflected in information on the kinds of

MISD Procedural Activity	Corresponding Life-Cycle Segment
Planning	Requirement Definition
Project Approval	Requirement Definition
Project Management	System Development
Monitoring of Operations	Operation
Other Operations	General
. Promotion of Standards	
. One-Time Studies	
. Procedure Development	
. Headquarters MIS Support	

FIGURE VI.1

MISD PROCEDURAL ACTIVITIES AND

CORRESPONDING LIFE-CYCLE SEGMENTS

decisions and information needed and on the numbers and type of personnel involved. In recognition of this, MISD management practices must adjust as a system evolves. The following descriptions of MISD procedural activities explain the changing role of MISD during the life-cycle process. These descriptions are amplified in Appendix C, Procedural Checklists. The checklists consist of points MISD must consider when reviewing and evaluating specific documents.

Planning

The traditional planning function is comprised of the following:

- setting goals;
- deciding on the strategy to use in achieving those goals; and
- devising a scheduled sequence of events (tasks) to achieve the goals.

As a senior staff organization, MISD is less direct in its planning, the functions of which are:

- to formulate overall AMIS/Army goals and policies;
- to provide guidance on developing better information capabilities and to influence the planning and development processes of those who develop and improve systems; and
- to coordinate the more detailed planning of various improvement efforts within the requirements of AMIS.

The formulation of goals and the other elements of MISD planning are analagous to those of organizations more directly involved in development or operations. MISD's planning activities join its two control mechanisms: approval of goals and assignment of resources. At the same time, the innovations related to improvements remain with design agencies and the more operational organizations.

A focal point for planning information is a master plan, which contains approved MIS programs for satisfying information needs. This plan contains time-phased data on all AMIS activities, thus providing the best picture of overall Army information services. The master plan links MISD planning with the budgeting process. A description of the kinds of information in this plan is given in the latter part of this section.

The items listed below are brief summaries of the functions of the procedural taskwork that takes places within MISD during the planning phase. These task functions are:

- to remain aware of the present MIS situation with regard to information services, capabilities, and costs. This includes determining when resources (new or being released) are available for assignment;

- to categorize the structure of Army Management Information Systems in a form that is useful for management and control, but relatively independent of the technical services provided;

- to provide a link between information systems planning, AMIS, and the Army PPBS;

- to determine information requirements of HQDA;

- to organize and coordinate the plans for improving AMIS;

- to develop procedures for and manage the generation of a master plan for projecting requirements and resources necessary for disciplined design, development, testing, and operation;

- to formulate policy guidance for structuring, managing, and improving the AMIS, both as an input to the master plan and for organizations providing inputs to the plan;

- to develop Army methodology on planning and managing development projects, including

specification of what constitutes completeness. This effort must be closely related to the activity of project progress monitoring;

- to participate in the review and evaluation of RSR, RSS, and OISR with regard to the master plan. These documents must reflect mature, well reasoned approaches to providing services that fulfill defined requirements. A significant part of this procedure will depend on subjective/qualitative criteria;

- to assess the impact of system changes on DPI and system operations and vice versa;

- to develop procedures for ensuring the financial integrity of improvement projects and proposed systems by coordinating and interfacing system plans with the annual budgeting cycle. This includes the processing or coordination of PCRs and providing advice on financial problems;

- to determine priorities among changes proposed for improving AMIS and to use the results of this determination, in conjunction with information on resource availability, to allocate resources;

- to coordinate AMIS data communications requirements and planning with Assistant Chief of Staff for Communications-Electronics;

- to coordinate with DCSPERS the training of competent information specialists and to assist in the development of projections on instructional needs and modifications, MOS considerations, etc;

- to promote cost-effective practices; and

- to promote the standardization of procedures and interfaces.

Project Approval

The function of this activity area is to decide whether to approve the development of system improvement projects. Many of the decisions are not absolute. An approval is often qualified by directing a shift in the content, time

frame, or direction of the development process. MISD reaches the decisions by reviewing and evaluating documents and remaining in close contact with the organizations involved.

Review and evaluation of projects occurs at certain critical design points. In a real sense, the projects under consideration are the systems themselves, as they exist at that particular point in time. The proposed project designs represent the objectives of the development organizations. By its participation in the approval process, MISD is able to influence project goals while they are being formulated. This is an important part of MISD's control apparatus. The basic decisions reached at each point of approval are whether future incremental costs will be worth the benefits and what action should be taken. Similar decisions must be made throughout the life cycle.

The review and evaluation activities require the processing of certain life-cycle documents, which are submitted to MISD during the requirement definition segment of the system life cycle and are described in Appendix A. Appendix C gives a detailed explanation of MISD processing of each of these documents. The decisions reached by MISD as a result of the evaluation are promulgated through directives. The MISD approval process is composed of two sets of tasks.

- MISD first reviews and evaluates system requirements and system specification documentation for proposed improvement projects. It then decides whether development should proceed, be modified, be delayed, or be halted. Evaluations consider the soundness of the concepts, the competency of development organizations, the availability of resources, the cost effectiveness of the system, and the impact upon other AMIS plans and objectives.

- After completing the first set of tasks, MISD promulgates directives that give the results of reviews and evaluations, assign responsibilities, and provide guidance for proceeding with the particular development efforts.

Project Management

MISD schedules approval sessions throughout the development phases of systems. However, the emphasis is shifted so that the monitoring of progress is the primary

purpose of the later sessions. MISD must make certain that design objectives are accomplished within the limits of available resources. To perform this important task, MISD relies on the project reports submitted by monitoring and developing organizations. These reports were described in Section V. Appendix B provides examples of a report hierarchy.

Project management reports submitted to MISD are used to compare actual progress with planned accomplishment in the areas of cost, performance, and scheduling. They allow early identification of problems needing MISD attention, as well as control of the system design. The latter is partially accomplished by examining the documentation to make sure that the basic system development steps are completed. The reports also allow MISD to judge the quality of the accomplishments and to see that configuration management principles with their control over the changes affecting performance are adhered to. The latter is of great importance because the management principles provide discipline.

In this regard, it is important to remember that the systems being produced are not physical things that can be compared with requirements to determine adequacy. They are still essentially conceptual in nature. Examination of documentation (e.g., progress reports, test results, production outputs, etc.) and familiarity with the developing organizations are the only ways to "know" how the project is doing.

The other function of MISD project management is deciding how to handle problems when something wrong is detected or when reorientation is needed. This, of course, depends on MISD's actual role and on the nature of the situation. Most problems are caused by shortages of men, money, time, or facilities. In these instances, MISD's role usually involves coordinating efforts to supply what is needed. This is accomplished by analyzing trade-offs, judging the impact of changes upon other projects, and objectively evaluating the systems competing for scarce resources. Most importantly, MISD substantiates the need for the recommended solutions to gain approval of the solutions. The importance of information in this process is manifest.

MISD's most difficult problem occurs when problems exist in meeting performance specifications. Its role is to pinpoint these problems as early as possible and focus

command and management attention on resolving them. Of greater importance is MISD's task of precluding or diminishing the occurrence of performance problems through improvements to system development.

Operations Monitoring

MISD is not vitally interested in the conduct of system operations. Its interest in operations is limited to understanding the AMIS structure, being able to estimate accurately the costs of providing Army information services, and ensuring the continuity of system management. To accomplish this, MISD needs historical resource data.

Knowledge of actual resource costs is used by MISD in gauging the accuracy of planning information. This is important because cost schedules for proposed information systems are often inaccurate. The data also aids in the preparation and substantiation of budgets and PCRs. The same is true of requests for ADPE. Thus, the historical data is used by MISD primarily as an input to other activities.

However, the system management process is also of interest to MISD during a system's operation segment. MISD needs assurance that responsibilities remain assigned and that configuration management, with its control over changes, is an ongoing activity. This interest is passive in nature, because system management practices are arranged by directive.

MISD Information Requirements

MISD's success in actively managing AMIS depends on its ability to make decisions and to know what is going on. To make those decisions meaningful, to develop plans, and to carry on the other activities just outlined, certain information is required. Figure VI.2, MISD Information Inputs, relates the needs to the procedural activities just discussed by showing:

- types of organizations providing information;
- categories of information that are available to or received by MISD;
- MISD procedural activities;

Source Organization	Information Category	Frequency of Input	Principal User (Procedural Activity)
RDA via MA	Project plans	Annually, Unscheduled	Planning, Approval
RDA & MA, via COA	MIS plans	Annually, Unscheduled	Planning
DPI & Commands, via COA	DPI plans	Annually, Unscheduled	Planning
DPI via COA	Descriptions of DPI capabilities	Initially, Unscheduled	Planning
RDA via MA	OIS and G&RS definition	Unscheduled	Planning, Approval
MISD, MA & Commands	Narrative plans of AMIS organizations, facilities, & systems	Annually	Planning
Varied	Descriptions and plans of study (or management improvement) efforts	Annually, Unscheduled	Planning
RDA via MA	Project/study progress and configuration management reports	Monthly, Quarterly	Project Monitoring, Operations Monitoring
DPI via COA	DPI actual operations statistics	Quarterly	Operations Monitoring

FIGURE VI.2

MISD INFORMATION INPUTS

- frequency requirements for input of information; and

- principal procedural activity interested in the information.

Some of the information received by MISD is used to generate analytic and summary reports. Whether the use of an Operating Information System is required depends on the data volumes, frequencies, sorting, and retrieval characteristics. The development of an OIS for MISD appears necessary, because much of the data can be handled more easily and can be used to provide more effective response in a mechanized form.

The information in Figure VI.2 is directly related to the needs of life-cycle management. The descriptions of information categories in the following paragraphs should be viewed within the context of that ongoing process.

Information Inputs to MISD

Project Plans. Plans for improvements to AMIS components are coordinated and summarized before they are included in the master plan. This planning information is part of the annual budget cycle and also part of the process by which improvement projects are cleared for implementation. The information consists of narrative descriptions of goals, a work breakdown structure, cost, schedule, and performance data for each included project.

MIS Plans. These plans describe resource requirements, including financial data. Budget data, including identification of appropriations and DPIs, is particularly important. MISD also has a need to be informed of Budget Program Change Requests. The quantitative data is extractable from DPI plans if the plans include a breakdown according to OIS.

DPI Plans. This data consists of an expanded version of that submitted in accordance with AR 18-3. It includes an additional breakdown, which shows cost, schedule, and performance by designated OIS. Budget/appropriation data is also added.

Descriptions of DPI Capabilities. This data describes and categorizes each facility by equipment, languages, and manpower.

OIS and G&RS Definition Documents. These are RSR, RSS, OISR, OISS, and OISDP, as explained in Appendix A. They describe and specify reporting and component operating systems as they evolve.

Narrative Plans of AMIS Organizations, DPI Systems. In addition to the more quantifiable data, MISD needs narrative descriptions of MIS plans for HQDA and major commands. These plans state overall goals and efforts, including the needs for management and analytical studies, the direction of projects, significant changes and problem areas, and personnel, communications, and ADPE requirements. This information is used by MISD in laying the groundwork for future systems, in drawing up the master plan, and in determining the impact the plans submitted have on the Army.

Project/Study Progress and Configuration Management Reports. This information is described in Appendix B. The reports show project status, i.e., actual versus planned resource expenditures, accomplishment of milestones, cost, schedule, and performance data, problems, and changes.

DPI Actual Operations Statistics. This data corresponds to that submitted in accordance with AR 18-3. As with the DPI planning information, it includes cost, schedule, and performance data for each designated OIS. Identification of budget appropriation is also useful.

MISD Generated Information

The information inputs just described are used in many ways. However, they require some preparation before they can be used by the MISD staff. As shown in Figure VI.3, MISD Generated Information, the information is classified and placed in at least four categories.

Inventory Lists. The following are needed to describe AMIS:

- project inventory - by organization and by budget program;
- reporting systems - showing component OISs;
- ADPE inventory - by organization and by equipment;
- DPI inventory - by organization;
- personnel inventory - by skill and by organization.

Source Organization	Information Category	Suggested Input Frequency	Principal User (Procedural Activity)
MISD	Inventory Lists	Annually, Quarterly	All
MISD	MIS Financial Analyses	Annually, Unscheduled	Planning, Approval, Project Monitoring
MISD	Project/Study Management Summaries	Monthly, Quarterly	Project Monitoring, Operations Monitoring
MISD	Master Plan	Annually	Planning, Approval

FIGURE VI.3

MISD GENERATED INFORMATION

MIS Financial Analysis. This information is needed for impact analysis, cost-effectiveness studies, system design, budget preparation, and detection of problems, especially of potential cost overruns. The primary data elements necessary are dollars and manpower, in the following areas:

- projects - by budget program;
- organizations - by appropriations; and
- appropriations - by organization and by project.

Project/Study Management Summaries. These reports combine project progress and status reports and summarize them for use in monitoring and problem detection.

Master Plan. The information in the master plan performs the following three functions.

- It provides a tool for controlling changes to AMIS.
- It provides an overview of AMIS as an entity for use as a basis for creating improvements.
- It provides guidance to organizations responsible for accomplishing improvements and managing operations.

The plan contains narrative descriptions of goals, methodology, and new directions for up to five fiscal years. Included are sections for major commands, HQDA staff agencies, and other organizations. It also provides guidance to these organizations to aid in the accomplishment of their plans.

Tabular data contains approved plans for projects, reporting systems, organizations' DPIs, and other needed summaries. Again, a five-year period is covered, but only plans for approved programs are included. Some activities are aggregated rather than described individually; this is done to limit the size of the master plan by including only the more important cost centers. The more important tabular summaries contain reporting system plans as collections of their component OIS and DPI plans to concisely depict their time-phased resource schedules. The master plan also links systems planning directly to the program/budget process.

The following items comprise the master plan just described:

- narratives:
  - AMIS (general Army) plans;
  - command (organizational) plans;
  - Guidance and Reporting System;
  - headquarters (functional) guidance;
- project plans/schedules:
  - identification;
  - cost;
  - schedule;
  - performance;
- G&RS/OIS plans/schedules:
  - identification;
  - cost;
  - schedule;
  - performance;
- commands (cost, manpower schedules):
  - DPI;
  - OIS;
  - ADPE;
- summary of G&RS resources:
  - cost/G&RS;
  - MPR/G&RS;

- contractor schedules:
  - projects;
  - operations;
  - studies;
- changes to ADPE (for COA):
  - by model;
  - by DPI;
  - by utilization;
- personnel summary;
- communications summary; and
- budget/program guidance.

VII. MANAGEMENT CRITERIA

The Management Information Systems Directorate's task of improving the overall quality of AMIS requires accurate evaluations of individual management information systems. These evaluations are made by staff members who have no intimate knowledge of the functions or purposes of the systems. Therefore, evaluation criteria that correctly reflect system performance are essential. The reliability of these criteria is especially important because the evaluations result in recommendations for system modifications, objectives, and resource expenditures. Before the personnel responsible for individual management information systems can accept these recommendations as authoritative and worthwhile, they must accept the evaluation criteria as reliable and relevant to system performance. If the criteria are not accepted, MISD cannot effectively administer its control function.

Although MISD improves AMIS to some degree by providing a life-cycle methodology, AMIS is improved principally by MISD decisions on resource expenditures and system objectives. Each MISD decision is unique, because each system is different and each system changes as it develops. However, the situations with which MISD deals share important common characteristics. Furthermore, many are related by the context of life-cycle management. Because of this, the development of procedures for use in determining values and reaching sound decisions is possible. These procedures provide the framework necessary for evaluations of complex systems, which involve a large number of variables and dynamic values, any one of which could be critical to success. The framework is also useful in teaching new staff members how to conduct an evaluation or a review.

Cost-Effectiveness Concepts

Setting Objectives

One of the objectives of the MISD decision-making process is:

- to obtain maximum system performance from a specified amount of resources; or
- to obtain a specified level of system performance for the least possible resource expenditure.

When MISD studies AMIS for the purpose of setting overall policy, priorities, or guidelines, it places more emphasis on the first alternative. When studying a particular project, MISD places more emphasis on satisfying requirements at the least cost. However, neither objective is exclusively used in either situation.

The important parts of any evaluative process are system performance objectives and the limitations or costs involved. To conduct evaluations and reach sound decisions, it is necessary to understand both. This involves regarding either performance or cost as a constant for evaluation purposes. When MISD understands the objectives and limitations or costs of a system, it develops criteria for use in gauging the value of that system.

Defining Criteria

In the general sense, a criterion is a measure that is used as a yardstick for comparison and decision-making. In their most desirable form, criteria are numbers that can be compared with actual measurements. For instance, if the criteria for an acceptable query response time for a proposed OIS is "less than one minute," it is obvious that an OIS with a response of 30 seconds meets the criteria. Therefore, it appears that the use of an exhaustive set of performance specifications is all that is necessary to determine whether a system or proposed change is adequate. However, though such sets are useful, they are not sufficient for MISD's purpose for the following major reasons:

- some criteria cannot be adequately quantified (e.g., the value of having or not having information);
- the accuracy of data (e.g., projected performance, such as query response times) is not obvious;
- assumptions about user requirements may not be understood or may not be valid;
- cost estimates may be low, and if their derivations are not known to evaluators, their flaws will be hard to detect;
- comparisons must be made between systems which do different things but which compete for scarce resources (e.g., money, men, equipment, etc.);

- the competency of the individuals and organizations involved is an important variable that must be judged or assumed;

- some system requirements submitted as constants may change, or if stated as averages (e.g., 1,000 file changes per month), may not reflect major fluctuations from those averages;

- the success of a proposed improvement project depends on many uncertainties;

- some requirements are approximations based on other approximations;

- ratios are used to relate performance to cost, thereby preventing the absolute values from being visible to the staff evaluator; and

- important intangibles or uncertainties may be deleted or ignored because they cannot be adequately specified or measured, thus resulting in a lack of flexibility in the designs for different situations.

A simplified example of the questions MISD faces involves the proposed acquisition of an input/output device for a time-shared system. Several factors must be considered in making a decision. For instance, the maximum transmission rate of the device may not be as important as its ease of use. A high transmission rate may result in reduced accuracy. Furthermore, maintenance may be a problem if engineers are not readily available or if the device's components are not reliable. The time and expense involved in designing record formats is also an important factor. Finally, operators may need a new kind of training to overcome psychological barriers erected as a result of the acquisition of such a device.

It is obvious that MISD does not accomplish this level of analysis. Evaluation of such factors is the responsibility of the MA and RDA. However, MISD does make a decision based on the information contained in the documents submitted by the MA and RDA. For the more important projects, MISD staff members become more involved in the actual research and do not rely solely on reviewing the MA and RDA documents.

Evaluation Procedures

Two factors dictate the kinds of criteria used by MISD in evaluating AMIS and proposed improvements: the accomplishments desired and the types of decisions required. The first factor, the accomplishments desired, involves the scope of the study, i.e., the necessary measurements and level of detail. AMIS studies look at the macro-view. These studies are probably the most subjective, stressing planning for the future. They concentrate on aggregates of resources and gross requirements for accomplishing MISD goals. Studies on a particular G&RS are more detailed in this perspective, but still stress questions and approaches for use in satisfying requirements. Studies of individual OISs are the most detailed and quantitative.

The second factor affecting the kinds of criteria used is the kinds of decisions (actions) required of MISD. This varies with the subject's life-cycle phase and priorities, and with the role MISD plays in relation to the subject. During the requirement definition segment, planning is long-range and conceptual. Decisions on setting and approving goals are most important. MISD's role may be to review and advise rather than to approve or take action. During the system development segment, emphasis is on ensuring adherence to plans and on early detection and elimination of problems impeding progress. Few active decisions are required of MISD during the operation segment.

Section VI and the procedural checklists in Appendix C contain evaluation guidelines with the criteria MISD needs to manage systems. The procedures directly relate to system life-cycle processes. MISD's internal planning activity is included as well as steps for processing important documents. Processing the documents, either for review or for evaluation purposes, offers MISD its best opportunity to promote good engineering and management practices while improving AMIS.

In addition to affecting system content and development, MISD staff involvement ensures clear communications between users and technicians. This is a result of greater emphasis on preparation and planning prior to the expending of development funds. The greater emphasis on preparation and planning manifests itself in clearer specification of requirements and systems performance in terms of products and services. Communications are also enhanced by the clarification of accomplishment and cost schedules. Early decisions are formally linked and reinforced within the life cycle by periodic submissions of technical and progress reports so that status and problems are visible on a systemwide basis.

The criteria guidelines used in the MISD management process are explained in Appendix C, which should be used in conjunction with the document formats in Appendices A and B. The appendices are organized for direct use in managing information systems throughout their life cycles. The criteria and the methodology for applying them to reach the best decisions are extremely important to the task of improving the quality of management information. They do not replace the use of judgment in MISD decision-making; however, they reduce the uncertainties involved, improve the quality of preparation for changes, ensure the integrity of the concepts on which the systems are based, and aid in an early detection of problems. These criteria are essential to coping with AMIS dynamics.

VIII. IMPLEMENTATION PLAN

This report marks the conclusion of Peat, Marwick, Livingston & Co.'s taskwork under contract DAHC 19-67-C-0052. The study performed by PML has resulted in a number of promising accomplishments. Among these are the AMIS classification scheme, life-cycle management, and resource monitoring. Ancillary support activities' contributions included aid in developing a draft AR 18-xx (Appendix D) and in formulating the master plan. The capability requirements, procedural guidelines, and systematic approach to upgrading Army management information systems contained in this report are also a product of the study activities. They comprise the system designed to provide the Army with sufficient criteria and procedures to more effectively manage AMIS.

Objectives

As stated in Section I, promulgation of an Army Regulation similar to that in Appendix D is the first of three stages in the task of improving MISD's management capabilities. This section presents PML's approach to the next stage, i.e., implementation of the concepts developed during the study. PML believes the following three steps must be taken by the Army to reach its near-term objectives and, eventually, its long-term capability objectives:

- refinement of procedures for a life-cycle control system to ensure comprehensive reporting of:
  - basic management requirements;
  - systems designed to meet these requirements;
  - progress during the development of these systems throughout the Army;
- development of a resource monitoring system (in conjunction with the Controller of the Army) to measure costs, manpower, machine time (computer time), and other r rce expenditures during the development and operations of systems; and

- development of a comprehensive systems management guideline for MISD's use in applying weapons systems acquisition concepts to the development of information systems throughout the Army.

These objectives are discussed more fully in the following paragraphs.

Procedures for Life-Cycle Control System

As a result of its study, PML recognized that the primary causes for system deficiencies, both in terms of costs and of meeting performance objectives, are the failure to adequately define system requirements and the failure to follow a logical progression of steps throughout the system development process. In too many cases, system development and programming begin immediately after concept development, without an adequate system design and project plan.

Peat, Marwick, Livingston & Co., in conjunction with MISD, has identified a series of phases (i.e., the life cycle) through which a system must pass if the development effort is to be efficient and successful. In addition, report formats have been defined to indicate the completion of these steps and to provide MISD with an adequate data base for reviewing the overall status of system development in the Army. These concepts are outlined in Section III of this report. An initial set of procedures for improving the current information system environment is contained in the draft AR 18-XX in Appendix D. These procedures may be enhanced and extended to incorporate the total life-cycle management concept.

Resource Monitoring System

To ensure effective use of the scarce Army resources available for information systems, Peat, Marwick, Livingston & Co. has identified a resource monitoring system that will report planned and actual expenditures (in terms of dollars, manpower, and other critical resources) for system development projects. Additional information requirements were identified for the collection of data on manpower and machine time and dollar costs for the operation of individual systems. Although the latter data may be difficult to obtain, it is extremely important:

- to provide a basis for improved estimation of operation costs during the development phase; and

- to permit better forecasting of workload requirements for data processing installations (DPIs) and for specific computer configurations.

These requirements for the collection of data as individual systems have been forwarded to COA by MISD and are presently under review. There appears to be general agreement on objectives, and alternative procedures for actual collection of data are being analyzed.

Systems Management Guideline

Although the above reports and data collection procedures provide MISD and the HQDA Staff with a good, top-level management tool, they can be effectively responded to only if corresponding system management techniques are applied by those actually charged with the responsibility of developing information systems. These techniques are currently being used in the weapons systems acquisition process with good results, and are equally applicable to the tasks of system development.

The system management approach includes the development of a complete project reporting system, correlated to the major end products of the effort; the application of configuration management techniques, including the definition of baseline specifications that establish the critical measures of system performance; and the utilization of an effective change control procedure to ensure agreement by those affected, i.e., from the programmer to the ultimate management user.

Tasks and Products

Accomplishment of the above three objectives could be divided into two major tasks:

- assistance in testing and implementing the proposed reporting and data collection procedures; and

- development of a supporting "Systems Management Guide" for use in managing the development of management information systems, utilizing the life-cycle approach.

Task 1: Assistance in Implementation

The task of assisting the Management Information Systems Directorate in implementing the above recommendations would consist of a variety of support efforts. These efforts are described below.

Assist in Implementing Procedures. Providing the Army with assistance in implementing the life-cycle control system procedures would be the primary purpose of this task. This effort would include:

- assisting MISD in testing the draft procedures;
- explaining the procedures to HQDA staff and field personnel;
- assisting MISD in accepting and evaluating initial submissions; and
- revising procedures if operating difficulties arise.

Refine Resource Monitoring Procedures. The second important effort would be to assist MISD in refining resource monitoring procedures for use in management information system development and operation. This effort would include:

- analyzing and reviewing the proposed data collection system;
- identifying detailed changes required in the accounting system and the other reporting systems;
- developing specific formats for reports to MISD and the HQDA staff; and
- assisting MISD to integrate this information with that collected through the life-cycle control system procedures.

Review Regulatory Structure. This effort would call for assisting MISD in a comprehensive review of the entire series of regulations governing management information systems. This review should result in recommendations for changes in existing regulations to permit more efficient and effective management.

Develop Internal MISD Procedures. The development of internal MISD procedures would build on the MISD procedures checklists developed to guide in the review of the documents prescribed in the life-cycle control system. As data become available through the life-cycle control system and the resource monitoring system, MISD would require some level of automated support to effectively accept and work with the information. This effort could be accomplished through a simple, but flexible file maintenance and reporting system to permit MISD to maintain current plans and status information on major systems and to report this information in a variety of ways.

Task 2: Development of Systems Management Guideline

For the reporting procedures of the life-cycle control system to be effective, they must summarize a more detailed and comprehensive management system to assist those directly responsible for managing and developing new information systems. It is recognized that the development of a large information system, like the development of a large hardware system, must be carefully planned and managed if the most effective result is to be obtained within time and resource constraints.

The purpose of this task would be to develop a detailed guide for the application of the life-cycle concept of system management to the development of MISs. It is assumed that the guide would not be a compulsory set of regulations, but would explain the basic concepts of life-cycle systems management as applied to information system development. It is further assumed that the guide would illustrate these concepts with usable formats and procedures. Although the final contents of the guide would be developed during the proposed effort, it is probable that the topics discussed in the following paragraphs would be covered.

Organization. The organization section of the guide would deal with the principles of effective project organization and the relationship of project organization to the end products or objectives of the effort and to cost and resource control. The section would include recommended responsibilities for the project manager and his principal technical supporting managers, as well as an outline of the role of the HQDA staff and related field organizations.

Project Planning. The project planning section would deal with methods of establishing a realistic project plan; estimating cost, manpower, and other critical resources; developing and using a work breakdown structure for the project; establishing baseline performance specifications for the system; and identifying funding sources and contractual, facility, equipment, and other support requirements.

Progress Reporting. The progress reporting section would deal with the development of an effective progress monitoring system. The system would be established to continuously track the status of critical end items in terms of time, cost, and performance, and to identify potential problems prior to their occurrence.

Change Control. The change control section would deal with methods of identifying changes to the system, of assessing the impact of these changes in terms of time, cost, and performance, and of developing a review and approval process to ensure communication of all changes to those affected with a minimum of time and administrative workload.

Documentation. The documentation section would deal with efficient and effective means of system documentation at all levels, from overall design through detailed program documentation and operating procedures

Project Schedule

Peat, Marwick, Livingston & Co. anticipates that the two major task areas involved in the implementation and testing of the life-cycle control system and the development of a supporting systems management guideline to achieve the three near-term objectives would be conducted concurrently over a 12-month period.

APPENDIX A

REQUIREMENT DEFINITION DOCUMENT FORMATS

This appendix contains descriptions of documents submitted to MISD during the requirement definition segment of the system life cycle. An attempt has been made to approximate the format of the actual documents, as well as to include descriptions of the information required for each. The documents described are:

- Guidance and Reporting System Requirement (RSR)
- Guidance and Reporting System Specification (RSS)
- Operating Information System Requirement (OISR)
- Operating Information System Development Plan (OISDP)
- Operating Information System Specification (OISS)
- Application Specification

GUIDANCE AND REPORTING SYSTEM REQUIREMENT (RSR)

1. Purpose of RSR

a. This agency has a requirement for a Guidance and Reporting System to provide information services at HQDA in the following functional areas:

(List areas, i.e., Finance, Logistics, etc.)

b. The proposed G&R System will also satisfy, in full or in part, information requirements in the above functional areas for the following organizations or agencies:

(Name agency or command, designating organizational level)

c. The system will also provide the following:

2. Background

a. Reference is made to the following directives:

b. General: (Describe background and events leading to recognition of the information requirement. State why the requirement exists, relating it to organization missions and functions. If the requirement is currently supported or satisfied in full or in part by an existing information system, describe changes in environment or inadequacies of current system that make it unsatisfactory for continued use.)

3. System Description

a. Objective of the System: (State objective of system or of system improvement. That is, state the products and services of the system in terms of performance; e.g., the system will provide civilian pay expenditure information at HQDA prior to 5th working day of the following month. Include the frequency of requiring the products and services.)

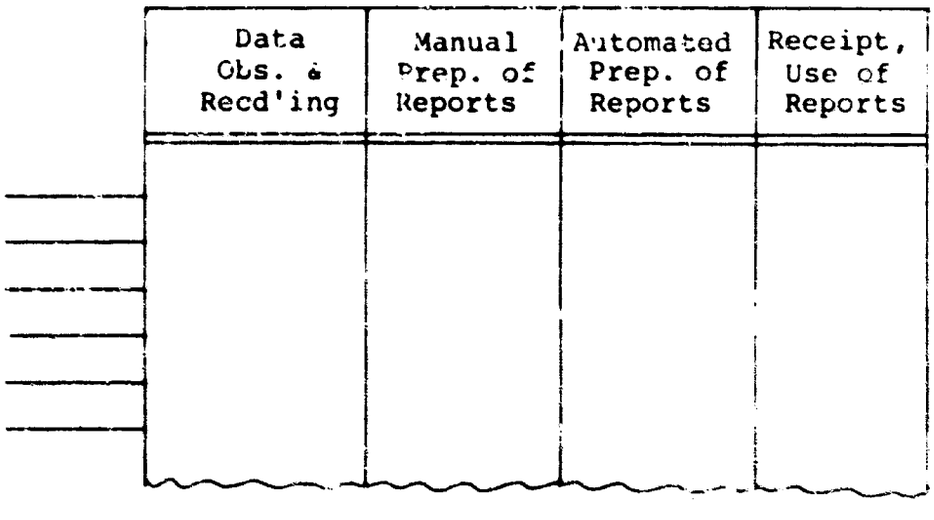
b. Functions To Be Supported by the Proposed System: (State the uses of the system products in terms of functions supported, such as monthly review of expenditure for civilian pay.)

c. Scope: (State information functions encompassed at any processing level, e.g., all civilian manpower management functions except daily time and attendance records for pay purposes. State the extent of changes to present procedures and information requirements.

d. Supporting Organization

(1) Army Elements

The following Army organizations will be required to perform the designated functions within this system:



(2) Data Processing Installations

It is anticipated that data processing in support of this system will be performed at the following data processing installations (DPI's) in support of the following organizations:

DPI's	Organizations

e. Information and Data

(1) Information and Data Elements

The following data elements or data element groups (e.g., civilian employee identification, hours worked by week, absences, and leave) will be observed, recorded, processed and reported within this system:

(2) The basic sources of data entering this system are:

Data Element or Group	Source

(If, within this G&R System, data is not gathered at source but is obtained from other information systems, describe method of operation of other system up to the point at which data or information enters proposed G&R System.)

(3) Data Flow: (Include a flow chart, using symbols per AR 18-7, that illustrates flow of data from source, through reporting organization, to final information user; show interfaces with other G&R Systems. State briefly the processing to be accomplished by DPI's and the communication media to be used.)

4. Resource Requirements by Fiscal Year: (Prepare estimates of total resource expenditures for development and operation of the system by fiscal year. Identify specific tasks that will involve significant resource expenditures, e.g., new ADPE purchases, large new development efforts, major modifications to existing operating systems. State how the system will be financed during its life cycle, and, if system development is funded, note source of funds. State requirements for Program Change Proposals.)

a. Development

Indicate resource expenditures for system development as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Other						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

b. Operation

Indicate resource expenditures for system operation as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

5. Other Comments:

GUIDANCE AND REPORTING SYSTEM SPECIFICATION (RSS)

1. Identification and Purpose of RSS

a. Identification

(1) System title: _____

(2) System number (assigned by MISD): _____

(3) Agency submitting RSS: _____

(4) Reference to original RSR:

(a) Date and proposed title: _____

_____

(b) Agency submitting RSR: _____

_____

(5) Reference to directives: _____

_____

b. Purpose

(1) The proposed G&R System will support HQDA management information requirements in the following functional areas:

(List areas, i.e., Finance, Logistics)

_____

(2) The proposed G&R System will support, in full or in part, information requirements in the above functional areas for the following agencies or organizations:

(Name agency or organization)

_____

(3) The system will also provide the following services:

_____

_____

2. Revised RSR Items: (Entries should be made in this section only if items are changed from RSR entries.)

a. Objective of System: (State objective of system or of system improvement. That is, state the products and services of the system in terms of performance; e.g., the system will provide civilian pay expenditure information at HQDA prior to 5th working day of following month. Include the frequency of requiring the products and services.)

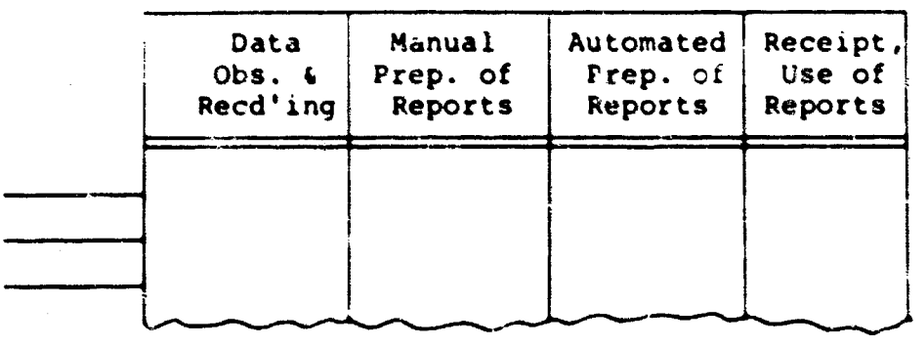
b. Functions To Be Supported by the Proposed System: (State the uses of the system products in terms of functions supported, such as monthly review of expenditure for civilian pay.)

c. Scope: (State information functions encompassed at any processing level, e.g., all civilian manpower management functions except daily time and attendance records for pay purposes.

d. Supporting Organization

(1) Army Elements

The following Army organizations will be required to perform the designated functions within this system:



(2) Data Processing Installations

It is anticipated that data processing in support of this system will be performed at the following data processing installations (DPI's) in support of the following organizations:

DPI's	Organizations
_____	_____
_____	_____

e. Information and Data

(1) Information and Data Elements

The following data elements or data element groups (e.g., civilian employee identification, hours worked by week, absences, and leave) will be observed, recorded, processed and reported within this system:

_____

_____

(2) The basic sources of data entering this system are:

Data Element or Group	Source
_____	_____
_____	_____

(If, within this G&R System, data is not gathered at source but is obtained from other information systems, describe method of operation of other system up to the point at which data or information enters proposed G&R System.)

(3) Data Flow: (Include a flow chart, using symbols per AR 18-7, that illustrates flow of data from source, through reporting organization, to final information user; show interfaces with other G&R Systems. State briefly the processing to be accomplished by DPI and the communication media to be used.)

3. System Specification

a. System Overview: (Provide a flow chart and narrative for Army organizations and data flow with DPI's identified by number for each Army organization.)

b. Source Data Groups or Elements Specifications: (Indicate the source of data. If data is not collected at operational source, show how data is obtained from another information system(s) and trace to source. Indicate method of observing and reporting data showing source document format and general instructions for preparation.)

c. Processing

For each processing level, indicate the following:

(1) Master File Descriptions (for each OIS)

(a) Content: (List information items contained.)

(b) Record Format: (Show sample formats.)

(c) Sequence (medium), etc.: _____

_____

(2) Input/Output and Report Specifications

This should indicate, for each OIS, specifications of tape or card files transmitted between processing levels, as well as any printed reports.

(a) Content: (List information items contained.)

(b) Record Format: (Show sample formats in accordance with AR 18-7.)

(c) Sequence: _____

_____

(3) Processing Required: (Include a flow chart and narrative, plus information on data controls, e.g., records counts, hash totals, etc., and backup files required.)

4. Development

State the approach for the accomplishment of the requirement, in terms of:

a. Major Tasks and End Products: (List.)

b. Financial Support Base: (Identify.)

c. Organization and Responsibilities: (Identify.)

d. Schedule of Accomplishment: (Prepare a Gantt Chart.)

5. Other Comments:

OPERATING INFORMATION SYSTEM REQUIREMENT (OISR)

1. Identification and Purpose

a. Purpose

This command/agency has a requirement to develop an Operating Information System to support:

(1) the following Guidance and Reporting Systems:

(Specify the proponent agency and RSS by title and reference)

(2) the following other information requirements:

b. Identification

(1) MA Proposed: _____

(2) RDA Proposed: _____

(3) Project Manager Proposed: _____

2. Background and System Concept

a. Background

(1) Applicable Directives: _____

(2) General: (Describe events leading to recognition of need to develop OIS.)

b. System Concept

(1) Objective of System: (State objective of system or of the improvement project in performance terms, e.g., reduce requisition turnaround time to less than four hours, if possible.)

(2) Scope: (State information functions encompassed at any processing level, e.g., all civilian manpower management functions except daily time and attendance records for pay purposes. If a multi-functional system, decribe all information functions by functional area.)

c. Data Processing Installations: (List data processing installations that will operate system.)

3. Resource Requirements

a. Development

Indicate resource expenditures for system development as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Other						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

b. Operation

Indicate resource expenditures for system operation as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

4. Other Comments:

OPERATING INFORMATION SYSTEM DEVELOPMENT PLAN (OISDP)

1. Purpose of OISDP

This agency has a requirement to develop the Operating Information System(s) identified in 2. below. This proposal details the tasks that must be accomplished to develop these systems, schedules for accomplishing the tasks, and supporting management data. (One OISDP is to be submitted for each set of Operating Information Systems for which a common development/improvement effort is intended.)

2. Identification

a. Title and Number of OIS: (Each OIS has a title that need not be unique. Numbers are assigned by MISD.)

b. Organization Submitting OISDP (originator): ____

_____

c. Monitoring Agency: _____

d. Guidance and Reporting System Supported by OIS: (List the name(s) and number(s) of the GR&S for which the systems are components.)

e. References:

(List preceding OISR, RSS)

_____

3. Purposes of OIS: (or collective purposes for a set of systems.)

a. The proposed OIS will provide information services to the referenced G&RS in the following functional ways:

(List the major functional services to be provided for the referenced G&RS by one or more OIS; e.g., collect and summarize xxxx data and produce xxxx reports, etc.)

b. The proposed OIS will provide the following additional services for other G&RS:

_____

_____

4. Revisions of Preceding RSS or OISR: (State information updating the preceding baseline documents, relating items to the formats of those documents.)

5. Plans for Developing OIS

A development plan must be included for each OIS, indicating the follcwing:

a. Work Breakdown Structure and Networks: (List tasks and milestones to be accomplished, specifying end products. Show task and product accomplishment relationships via PERT chart to permit management control over progress.)

b. Organization and Responsibilities: (State which organizations are responsible for accomplishing which tasks and show overall organization structure including MA and ARA. Specify System Manager.)

c. Schedules: (Show schedules for accomplishment of tasks.)

d. Progress Reporting: (Identify periodic reports to be submitted showing status of accomplishment, achievement of milestones, and expenditure of resources, together with frequency of reporting.)

6. Resource Requirements

a. Development

Indicate resource expenditures for system development as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Other						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

b. Operation

Indicate resource expenditures for system operation as follows:

	Current FY	FY+1	FY+2	FY+3	FY+4	FY+5
COST DATA*						
Government Personnel Services						
Contractual Services						
ADPE						
Personnel						
Capital Investment						
ADPE						
Other						
TOTAL						
MANPOWER DATA**						
Military						
Civilian						
TOTAL						

*In thousands of dollars
**In man-years

7. Other Comments:

OPERATING INFORMATION SYSTEM SPECIFICATION (OISS)

1. Identification

   a. Operating Information System (OIS) Title: _____

   _____

   b. OIS Number (assigned by MISD): _____

   c. Associated Guidance and Reporting System: _____

   _____

   d. References (as required):

      (Preceding RSS or OISR) _____

      (Operating System Directive(s)) _____

      (OISDP) _____

2. Purpose

   The purposes of the technical specification and of the subject OIS are:

   _____

   _____

3. Performance Requirements: (State assumptions, constraints, details for OIS performance service, and functional goals. Relate with RSS and G&RS. Include date from RSR. Quantify where possible.)

4. Products

   Describe what the system as a whole is to produce and relate this to performance requirements. List major outputs of system, including:

   a. Reports (periodic and unscheduled): _____

   _____

b. Files Maintained: _____

_____

c. Other Services Provided (for instance, handling of ad hoc queries, optional features, significant functions such as analyses, decision criteria):

_____

_____

5. Inputs

a. Data: (Include content, format, limits, accuracy, precision, media, sources, methods of collection, and mechanization.)

b. Files: (Include content, format, structure, keys, and media.)

c. Media: (Include communications, volumes, and timing.)

6. Data Flow: (Include flow charts that indicate the flow of information and processing logic from input to output for each application and for the system as a whole.)

7. Application Description: (List, for each application that is to be developed as a work package, the equipment, language, organization, interfacing considerations, input/output lists, intermediate results, files, operating procedures, quality controls, and error procedures.)

8. Documentation: (Describe the system documentation to be provided, including outlines of the contents of each document.)

9. Communications: (State the communications methods, media, volumes, and systems that are to be employed. Include interface characteristics for exchanging information with other systems.)

10. Testing: (Present preliminary design for testing, validation, acceptance, and implementation of system.)

11. Design Requirements: (Include data on languages, equipment constraints, program modularity, etc.)

APPLICATION SPECIFICATION

An Application Specification is to be developed for each OISS application description. This specification is supported by other, separately promulgated publications that prescribe Army policies, standards, and methodology in the areas of analysis, design, and programming. These publications reduce the continual redevelopment of these conventions and gain a common discipline for training.

Details for information needed in the technical specifications for applications have not been included in this report. The descriptions, standards, and conventions that are needed to define these specifications place them beyond the scope of the report. Briefly, however, the categories of information listed below must be included.

1. Identification: (Describe contextual and background material, including security factors.)

2. User Requirements: (Define the outputs of the system in terms of objective or purpose for the system, products (e.g., reports), services rendered (e.g., file maintenance), media dissemination and form, and, especially, performance specifications.)

3. Interval System and Programming Details: (Represent the logic of the information processing that transforms inputs into outputs for each program, including relationships between components, the sequence of events (through narratives and flow charts), decision tables, and other facts needed by the programming staff and the (future) program maintenance staff such as interfaces between subprograms and timing estimates.)

4. System Inputs: (Describe the information entered into the system, including the media, form, distribution, volumes (average, peaks, lows), and handling procedures.)

5. Data Elements: (Include definition, content, format, limits, accuracy, precision, media, forms, and sources.)

6. Quality Controls: (Define needs and procedures for assuring data quality through the system, including, for instance, audit trails.)

7. System Configuration: (Describe equipment (installed/ required), information flows (including communications interfaces), storage allocation, program organization, file structure, and supervisory (executive) systems, including facilities and communications requirements.)

8. Error Procedures: (Include descriptions of controls and procedures within programs, communications, and handling procedures. Describe, within each program's flow chart, how data quality will be assured, documentation, and recovery procedures.

9. File and Table Descriptions

10. Testing Considerations: (Describe structure of test including procedural aspects, integration of components, and responsibilities for test development.)

APPENDIX B

PROJECT MANAGEMENT REPORT FORMATS

This appendix contains sample forms for the Project Management Reporting System outlined in Section V. The reports described are the following. Figure B.1 shows the distribution of all reports.

- The Project Summary Report is a monthly summary of the status of major information system projects and studies. This report contains a tabular listing of status of each project/study cost and schedule, with a short narrative. It is intended for RDA's, monitoring agencies, MISD, and staff agencies.

- The Project Management Report is a monthly status report. One report is prepared for each system project or study that is included in the Project Summary Report. The Project Management Report includes a project/study description, cost and schedule status, and a problem analysis. This report is designed for RDA's, monitoring agencies, project managers, and project engineers. MISD and Army staff agencies receive individual Project Management Reports on an exception basis or on request.

- Lower Level Project Management Reports provide data on the monthly status of a project/study in a form identical to that of the Project Management Report, but include more detailed information for separate phases or parts of individual projects. These reports offer flexibility in reporting at different levels of detail, depending on the size and complexity of the project and the division of management responsibilities. The Lower Level Project Management Reports are intended for project managers and project engineers; RDA's and monitoring agencies receive the reports on request. Because the actual composition of the reports varies with the information requested, this report is not described in greater detail in this appendix.

REPORT	PROJECT SUMMARY REPORT	PROJECT MANAGEMENT REPORT TOP LEVEL	PROJECT MANAGEMENT REPORT LOWER LEVEL
REPORT FREQUENCY	MONTHLY	MONTHLY	MONTHLY
MISD	TOTAL REPORT	REQUEST/ EXCEPTION[1]	
STAFF AGENCIES	TOTAL REPORT		
MONITORING AGENCIES	PARTIAL REPORT PER RESPONSIBILITY	ALL APPROPRIATE PROJECTS	WHEN REQUESTED
RESPONSIBLE DEVELOPMENT AGENCIES	PARTIAL REPORT WHEN REQUESTED	ALL APPROPRIATE PROJECTS[2]	ALL APPROPRIATE PROJECTS
PROJECT MANAGERS/ PROJECT ENGINEERS	PARTIAL REPORT WHEN REQUESTED	ALL APPROPRIATE PROJECTS	ALL APPROPRIATE PROJECTS

[1] REQUEST/EXCEPTION THE REPORT WILL BE DISTRIBUTED WHEN REQUESTED, OR ON AN EXCEPTION BASIS (E.G., WHEN LARGE OVERRUNS OR SLIPPAGE ARE REPORTED)

[2] ALL APPROPRIATE REPORT RECEIVED FOR ALL PROJECTS WITHIN INDIVIDUALS RESPONSIBILITY

FIGURE B1-REPORT DISTRIBUTION MATRIX

PROJECT SUMMARY REPORT

A sample Project Summary Report is shown in Figure B.2. This sample illustrates that, for each project, one line of tabular status data, plus two lines of narrative, is provided. The various projects can be listed in any order, such as by responsible agency, by decreasing dollar size, etc., to improve readability of the report. The column and line headings of the report are as follows:

- PROJECT: identifies a project by name and project number;
- ORGN RES: identifies the organization responsible for the project;
- CONT. TYPE: identifies the type of contract(s) that applies to a project. An "F" indicates a firm fixed price contract, "R" indicates a cost reimbursable contract, and an "M" indicates combination of a firm fixed price and cost reimbursable contract. An "A" indicates that the project is an Army effort having no contractual assistance;
- PROJECT COST STATUS - TO DATE: presents project cost status in terms of:
  - ACTUAL: shows the cumulative actual costs incurred to date by the project office;
  - PLANNED: shows the cumulative planned costs that were to be incurred to date by the project office. This figure serves as the basis for comparing actual and planned costs;
  - VAR. $: shows the amount ACTUAL column less the amount PLANNED column, in dollars;
  - VAR. %: shows the VAR. $ over the amount in PLANNED column x 100;
- PROJECT COST STATUS - AT COMPLETION:
  - LATEST ESTIMATE: shows the Project Manager's latest total project cost at completion and is based on data from all sources;
  - BUDGET: shows the approved budget for the project and is the basis for comparing LATEST

ESTIMATE and the budget;

- VAR. $: shows LATEST ESTIMATE less the BUDGET;

- VAR. %: shows VAR.$ over the BUDGET x 100;

- TREND: shows the change in LATEST ESTIMATE from previous month to current month. If LATEST ESTIMATE is greater for the current month, show ↑; if the LATEST ESTIMATE is less for the current month, show ↓; if there has been no change, show 0;

- PROJECT FISCAL STATUS - CASH THIS FISCAL YEAR:

  - FORECAST: shows the Project Manager's total forecast cash payments to be made in the current fiscal year;

  - BUDGET: shows total budgeted cash payments to be made in the current fiscal year and is the basis for comparing forecast and budget costs;

  - VAR. $: shows amount in FORECAST column minus amount in BUDGET column;

- PROJECT SCHEDULE STATUS - TO DATE:

  - MILESTONE NUMBER: shows identifying number of the milestone, due for completion this month, that is being used to reflect current schedule progress;

  - SLACK WEEKS: shows schedule status of the milestone in terms of the difference in expected or actual completion from scheduled completion date. This figure can be positive or negative to indicate weeks ahead or behind schedule, respectively. If a PERT network is used on the project, the slack may be taken directly from this;

- PROJECT SCHEDULE STATUS - AT COMPLETION:

  - MILESTONE NUMBER: shows identifying number of the milestone used to signify project completion;

- SLACK WEEKS: shows schedule status of the milestone, as reflected in the MILESTONE NUMBER column, in terms of the difference between the expected completion and the scheduled completion date. This can be positive or negative to indicate the weeks ahead or behind schedule, respectively. This is normally the slack of the Critical Path if PERT is being used;

- TREND: shows change in completion SLACK WEEKS column from the previous month to the current month. If expected completion date has slipped from last month to this month, show -; if expected completion date has gained, show +; if there has been no change, show 0.

The two lines of narrative for each project can be used to explain the meaning of the data for cost, schedule, or fiscal status or to identify other matters of particular significance.

PROJECT SUMMAR

PROJECT	ORGN RESP	CONT. TYPE	PROJECT COST STATUS $(000)						
			TO DATE				AT COMPLET		
			ACTUAL	PLANNED	VAR. $	VAR. %	LATEST ESTIMATE	BUDGET	VAR. $

A.

SUMMARY REPORT

REPORT DATE _____

TUS $(000)				PROJECT FISCAL STATUS $(000)			PROJECT SCHEDULE STATUS				
AT COMPLETION				CASH THIS FISCAL YEAR			TO DATE		AT COMPLETION		
BUDGET	VAR. $	VAR. %	TREND	FORECAST	BUDGET	VAR. $	MILESTONE NUMBER	SLACK WEEKS	MILESTONE NUMBER	SLACK WEEKS	TREND

FIGURE B.2

B.

PROJECT MANAGEMENT REPORT

A sample five-part Project Management Report is shown in Figure B.3. The various parts of the report are as follows.

Part 1: Project Description

Part 1 contains a concise description of a project for use by those report recipients who are not actively involved in day-to-day management of the project. Part 1 is used as a cover sheet for the other parts of the report, and, except for the date, changes only when specific changes to the project plans (e.g., an increase in the number of units ordered or a change in the approved project funding) have been made. The form does not require a detailed explanation.

Part 2: Financial and Schedule Curves

The financial and schedule curves provide a graphical display of financial information that cannot be indicated by tabular data. This display includes an assessment of trends that provides management with a pictorial history of previous financial status and can be used to predict future results. The following curves can be plotted, depending on individual project requirements. Usually the information is displayed in pairs of planned and actual data:

- contracts awarded - actual: the actual value of contracts awarded to date;
- contracts awarded - planned: the planned costs for those items for which contracts have been awarded to date;
- project costs incurred - actual: the actual value of project costs incurred to date;
- project costs incurred - planned: the planned costs for work that the project has accomplished to date;
- progress payments - actual: the actual value of progress payments made to the contractor to date;
- progress payments - planned: the progress payments that were planned to have been made to the contractor to date;

- estimate to complete curves: for each of the curves previously described showing actual data, an estimate to complete may be added, when desired, to show projected progress;

- schedule trend curve: shows the monthly slack estimate for the key milestone or milestones on the project (usually project completion).

Part 3: Financial Status

The PROJECT COST STATUS and PROJECT FISCAL STATUS shown in Part 3 contain data identical to that in the Project Summary Report, with the exception that the cost trend column is not used. In Part 3, the total project is subdivided, using the Work Breakdown Structure, into the major items of work. Financial reporting is provided for each of these major items of work.

The columns and headings for Part 3 are as follows:

- DESCRIPTION: contains the descriptive titles of the project and of each item of work;

- CONTRACT TYPE: identifies the type of contract(s) used on the project. An "F" indicates a firm price contract; an "R" indicates a cost reimbursable contract; an "M" indicates a combination of firm price and cost reimbursable contracts;

- WBS NO.: identifies the items of Work Breakdown Structure, by number;

- RESP ORGN: identifies the organization responsible for each item of work;

- PROJECT COST STATUS - TO DATE:

  - ACTUAL: shows the cumulative actual costs incurred by the project to date;

  - PLANNED: shows the cumulative planned costs to be incurred by the project to date and is the basis for comparing actual and planned costs;

  - VAR. $: shows the amount in the ACTUAL column minus the amount in the PLANNED column, in dollars;

- VAR. %: shows the VAR. $ over the PLANNED column x 100;

- PROJECT COST STATUS - AT COMPLETION:

  - LATEST ESTIMATE: shows the Project Manager's latest total project cost at completion and is based on data from all sources;

  - BUDGET: shows the approved budget for the project and is the basis for comparing the LATEST ESTIMATE and the budget;

  - VAR. $: shows LATEST ESTIMATE minus the BUDGET;

  - VAR. %: shows VAR. $ over BUDGET x 100;

- PROJECT FISCAL STATUS - CASH THIS FISCAL YEAR:

  - FORECAST: shows the Project Manager's total forecast of cash payments to be made in the current fiscal year;

  - BUDGET: shows total budgeted cash payments to be made in the current fiscal year and is the basis for comparing forecast and budget costs.

  - VAR. $: shows FORECAST column - BUDGET column.

Part 4: Schedule Status

Part 4 shows in tabular form, the actual schedule status of the project and the expected schedule of the project, to provide an overall picture of the timing of actual and expected accomplishments. The column and headings for Part 4 are as follows:

- MILESTONE DESCRIPTION: shows the descriptive title for each major milestone. The milestones are grouped under the same major items of work identified in Part 3, so that schedule status for each major item can be compared with financial status for analysis;

- WBS NO.: shows the numerical identification for the Work Breakdown Structure item;

- MST NO.: shows the numerical identification for the milestone being reported;

- RESP ORGN: shows the organization responsible for accomplishing the milestone;

- SCHED. VAR. (WEEKS): shows the scheduled date minus the actual date or the scheduled date minus estimated date, in weeks;

- CALENDAR YEAR: the project schedule, shown in the center of the page, indicates for each milestone its scheduled date (shown as Δ), its actual completion date (shown as Δ), and its estimated completion date (shown as ⊣). Milestones at which an explicit report of status of technical progress will be made are circled;

- SCHEDULED DATE: shows the actual completion date of the milestone;

- ACTUAL/ESTIMATED DATE: shows the actual completion date or estimated completion date of the milestone.

Part 5: Problem Analysis

In Part 5 any problems related to the cost, schedule, or technical status sections of the report or problems as reported by other sources are described. For each problem, Part 5 should present:

- a concise statement of the problem;

- a description of the impact of the problem on the project;

- recommended action or action being taken to resolve the problem.

PROJECT MANAGEMENT REPORT

PART 1: PROJECT DESCRIPTION

PROJECT TITLE _____	PRO. NUMBER _____
RESPONSIBLE ORGANIZATION _____	PROJECT VALUE _____
PROJECT MANAGER _____	PROJECT TYPE _____
	REPORT DATE _____

NAME OF PRIME CONTRACTOR(S)	QUANTITY & ITEM TO BE DELIVERED	VALUE OF CONTRACT(S)
NAME OF SUB-CONTRACTOR(S)	QUANTITY & ITEM TO BE DELIVERED	VALUE OF SUB-CONTRACT(S)

PROJECT DESCRIPTION

FIGURE B.3

PROJECT MANAGEMENT REPORT

PART 2 FINANCIAL AND SCHEDULE CURVES

PRO. NUMBER		
REPORT DATE	DATA CURRENT AS OF	

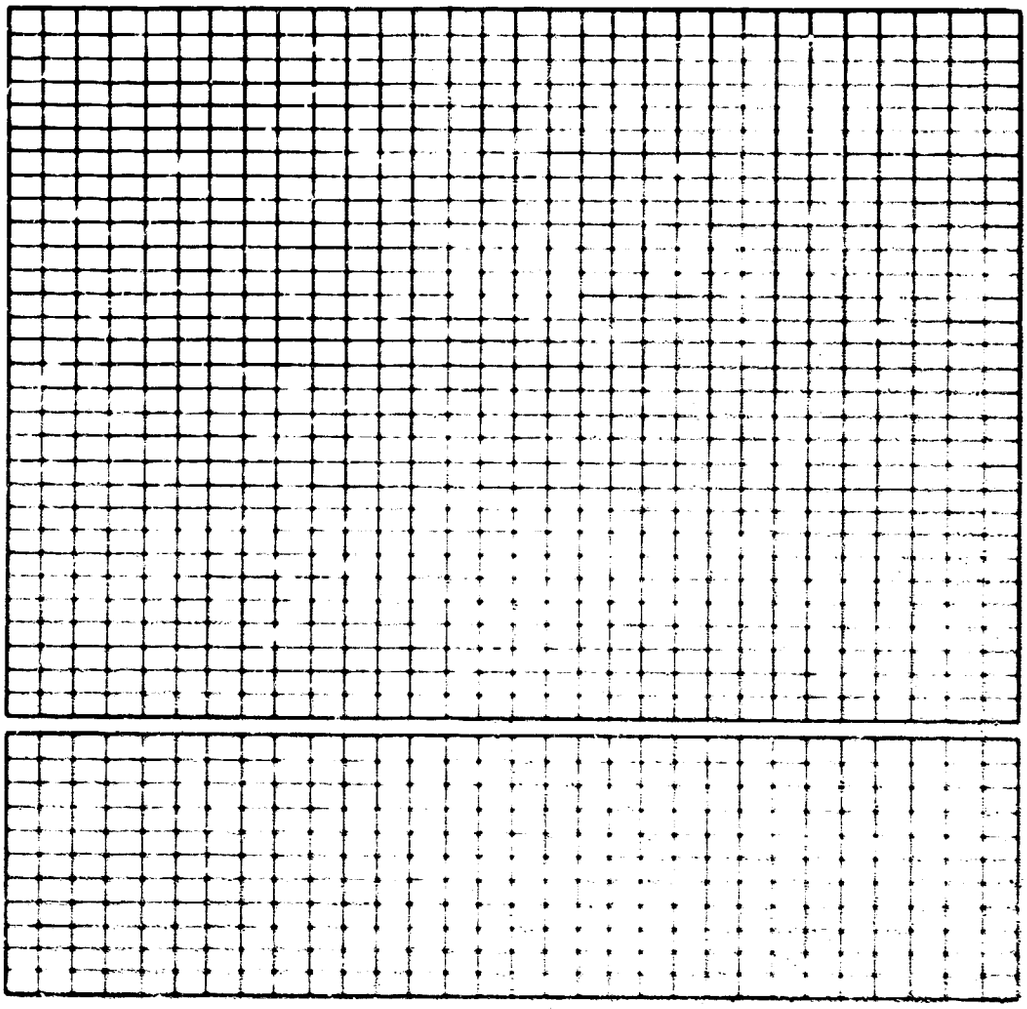


FIGURE B.1 (continued)

PROJECT MANAGEMENT REPO

PRO. No. ______________________

PROJECT TYPE ______________________

PROJECT ______________________

PART 3; FINANCIAL STATUS

DESCRIPTION	CONT-RACT TYPE	WBS NO.	RESP ORGN	PROJ		
				TO DATE		
				ACTUAL	PLANNED	VAR. $

PART 4; SCHEDULE STATUS

MILESTONE DESCRIPTION	WBS NO.	MST NO.	RESP ORGN	SCHED VAR. (WEEKS)	CALENDAR

WBS - Work Br

MST - Milestone

A.

CT MANAGEMENT REPORT

REPORT DATE ____________________

REPORT LEVEL ____________________

DATA CURRENT AS OF ____________________

PART 3; FINANCIAL STATUS

SP GN	PROJECT COST STATUS $(000)								PROJECT FISCAL STATUS $(000)		
	TO DATE				AT COMPLETION				CASH THIS FISCAL YEAR		
	ACTUAL	PLANNED	VAR. $	VAR. %	LATEST ESTIMATE	BUDGET	VAR. $	VAR. %	FORECAST	BUDGET	VAR. $

PART 4; SCHEDULE STATUS

CALENDAR YEAR	SCHEDULED DATE	ACTUAL ESTIMATED DATE

WBS - Work Breakdown Structure
MST - Milestone

△ Milestone Schedule
▲ Milestone Actual Completion
→▷| Milestone Estimated Completion

FIGURE B.3 (continued)

B.

PROJECT MANAGEMENT REPORT

PART 5 PROBLEM ANALYSIS

PRO. NUMBER	PROJECT	PROJECT TYPE
REPORT LEVEL	REPORT DATE	DATA CURRENT AS OF

PROBLEM AREA ITEM

FIGURE B.3 (continued)

APPENDIX C

PROCEDURAL CHECKLISTS

The Management Information Systems Directorate is responsible for processing life-cycle documents for the various systems that it reviews and/or approves. These doucments both describe the systems themselves and indicate the completion of significant system development efforts. In the same way that the phases of a system's life-cycle build upon preceding work, the processing of each document is predicated on earlier processing, reviews, and evaluations. Thus, the quality of life-cycle management depends on the correct processing of these documents. This appendix explains the processing procedures for documents submitted to MISD.

Each procedural checklist consists of items that should be performed, considered, or resolved. The procedures for a given document's processing are dictated by the decisions required during its review or evaluation; the decision criteria for a particular situation are determined by using the procedural checklists to guide the evaluation process and to satisfy the functional activities' needs and management criteria of MISD. The checklists presented here are designed to be used as part of the analysis procedures described in Section VI. The recommendations included in Section VIII are specifically designed to provide data for these analyses.

As discussed earlier, documents must qualify their systems in two ways: (1) on their own merits, as rational approaches to effectively meeting stated system needs; and (2) within the context of the Army's larger needs and the manner in which these are provided for through existing and proposed systems. That is, each system, through its documentation must be evaluated by MISD in terms of its own integrity and its cost effectiveness vis-a-vis its impact on the Army and the Army Management Information System.

Reporting System Requirement

In evaluating the merits of a proposed system, the Reporting System Requirement (RSR) is analyzed to review the purpose and need for the system, expected system performance, how its services are to be provided, and what its development and operation will involve. The following checklist is used in this evaluation:

- check RSR for overall completeness of the information needed for review and evaluation;

- examine system background to obtain an understanding of the context of the need for the system, the problems to be solved by the system, and the manner in which the system will satisfy the need or alleviate the causes of problems. The background must be related to the goals of the user organization, the system goals, and the functions to be performed; that is, there must be a clear "fit" between the system and the context of its requirement;

- compare functions to be performed by the system with system objectives, to ensure that system development is reasonable and desirable, and determine how the benefits that justify the system are to be provided;

- ensure that the system's components interface without conflict;

- examine the data flow and its processing requirements and procedures for completeness, quality control, and volume;

- perform a cost-benefit analysis (considering alternatives) of the system or review results of submitted analyses;

- relate cost-benefit analysis to the scope of the development effort, including an estimate of the effort needed to mechanize and remechanize source data;

- examine the communications requirement media and methods within and between data processing installations, and compare these with Army communications plans;

- consider the use of existing computer utilities and excess equipment, if acquisition of computers is involved;

- analyze contribution of data elements to final products and system requirements;

- make certain that the required information is not available elsewhere;

- determine if sampling techniques can replace exhaustive data collection;

- estimate the effort and resources needed to supply input data;

- be satisfied that the information and reporting frequency will continue to be required;

- examine other developments and RSRs to determine if a combination or other modification of system plans is warranted;

- make certain that data cost volumes, accuracy, and precision are commensurate with system requirements and values;

- review comments and recommendations of monitoring agency and other reviewing or interested organizations;

- ensure that security provisions are considered.

The second and more important part of RSR reviews involves gauging the system's effect on the AMIS and on other developments within the Army that might not be known to the submitting organization. Many of the improvement projects will be replacing, modifying, or obviating the need for existing systems and will therefore, require coordination. In addition, because many resources may have to be diverted from existing systems, it might be desirable to create a competition among different projects for the scarce resources available. Finally, all projects must be coordinated to reduce the chance of duplication and false starts and to ensure compliance with broad Army plans. The checklist for evaluating the impact of a proposed system is as follows:

- compare functions to be performed by proposed system with those of existing and other proposed systems, checking for excessive duplication of data and functions;

- estimate the financial (e.g., resource assignments) and technical changes required in affected systems, sources of funds and facilities, and the need for and effect of Program Change Requests;

- estimate the effects of changes in workload at data processing installations and on communications facilities;

- examine changes in training and personnel assignments necessary to support the system's life cycle;

- compare system functions and goals with those of the Army and AMIS, and examine the life expectancy of system requirements;

- compare equipment and facility requirements with planned procurements;

- to standardize and integrate systems, ensure compliance with ongoing efforts, with particular reference to technological developments.

The results of the RSR review and evaluation are provided to the submitting HQDA staff agency by letter. Because the system under consideration is only a preliminary concept, the review results do not indicate approval/disapproval. Rather, they indicate:

- potential problems, such as insufficient development resources, that might hinder or preclude attainment of objectives;

- undesirable duplications of effort, system functions, etc.;

- AMIS and Army considerations such as other requirements or projects, conflicts with the desired forms and structure of systems, and impact of technological innovations;

- other developments and considerations of interest;

- suggested modifications to the information requirements or system concept in light of the above.

Reporting System Specification (RSS)

In evaluating the merits and impact of the proposed system, the Reporting System Specification (RSS) is reviewed. This review includes consideration of the particular Guidance and Reporting System, the way in which it will impinge upon

AMIS at each step in the procedure, and conflicts between the two. This review is based on the following checklist items:

- examine system to determine if the system concept, requirements , assumptions, justification, etc., differ significantly from those approved for the RSR;
- review the approach for system development, implementation, and operation for completeness, financial stability, and the feasibility of the implementation schedule;
- determine the adequacy of the system justification by a cost-benefit analysis, that places emphasis on the system's contribution to management in relation to direct and indirect incremental costs;
- review responsibility assignments;
- review system specifications for completeness, feasibility, and adequacy;
- determine availability of communications requirements;
- produce the Operating Information System Directive;
- inform the Controller of the Army of requirements for facilities and equipment.

Operating Information System Requirement

In evaluating the merits and impact of a proposed system, the following checklist items are used in the review of the Operating Information System Requirement (OISR):

- check OISR for inclusion of information needed for the particular review and evaluation;
- examine background information to gain an understanding of the needs of and problems surrounding the system, including an examination of circumstances leading to causal situations, such as why uncertainties exist;

- relate the background with the goals of the user organizations, the system's goals, and the functions to be performed. There must be a clear "fit" between the system, its products, and the context of its requirement;

- ensure that a valid analysis was performed in producing the OISR;

- determine if the requested information products and services, if provided, would correct problem situations, fulfill stated needs, or reduce existing uncertainties, emphasizing specifically how the benefits used to justify the system will occur;

- analyze the contribution of data elements to final products;

- determine the practicality of providing source data, taking into consideration the effort and resources required by individuals, frequency of inputs, the incentive that individuals and organizations will have for providing data (e.g., how they will benefit) definitional problems, accuracy/precision, etc.;

- examine the flow of data and the requirements and procedures for its processing for completeness, quality control, and volume; note if unnecessary reentry of data into mechanized media occurs;

- ensure that the system's components interface effectively;

- examine the communications requirements media and methods within and between data processing installations, and compare these with Army communications plans;

- perform a cost-benefit analysis of system, including an analysis of the system's impact on AMIS and the Army;

- analyze the scope of both the development effort and operations in regard to the cost-benefit analysis;

- determine if sampling techniques can replace exhaustive data collection;

- be satisfied that the information and reporting frequency will continue to be required;

- consider the use of existing computer utilities in lieu of adding to local equipment;

- examine other developments, other OISRs, and RSRs to see if modification of any system or resource plans is warranted;

- make certain that the data cost, volume, accuracy, and precision are commensurate with system requirements and values;

- review evaluations, comments, and recommendations of the monitoring agency and other reviewing or interested organizations;

- ensure that security provisions and standards are considered.

At this point in the document review process, MISD must determine whether or not to grant approval to proceed with the system development. The HQDA proponent must be notified of this decision and supplied with supporting findings. If approval is predicated on meeting certain prerequisites prior to the beginning of development, this must be explained and all conditions must be detailed.

Additional guidance and information should also be included to cover:

- potential problems (e.g., insufficient resources) that will hinder or preclude attainment of objectives or that will result in inefficiencies;

- Army and AMIS considerations such as other projects or requirements, technological innovations, conflicts with the desired form or structure of management information systems, etc.;

- modification or redirection of the information requirement, system concept, or development approach because it involves duplication of effort or additional facts or occurrences;

- other pertinent developments and considerations.

This information, included in an Operating Information System Directive (OISD), also grants authority to proceed with the formulation of the OISDP and to assign responsibilities. If appropriate, a project charter is issued to specify objectives, responsibilities, authority, and resources.

Operating Information System Development Plan

For effective project control, system users must have a clear understanding of end product purposes, when they are needed, what their resource implications are, and how end products will be achieved. The Operating Information System Development Plan (OISDP) brings this information together at a significant point in a system's life cycle. MISD must make certain that adequate preparation has been made to commence actual development. Additional planning will still be required to ensure that schedules and contingencies can be met. In its review of the OISDP, MISD is responsible for the following:

- ensure completeness and overall quality of OISDP preparation;
- review adequacy of Operating Information System Specification and OISR, as amended, for technical agreement with plans;
- make certain that Work Breakdown Structure is adequately identified and described. Each description should include the content of work involved, interim products, task relationships, criteria for demonstrating accomplishment progress for control purposes, and methods or approaches to development, as necessary;
- validate phased resource schedules, including cost, manpower, equipment, and facilities for applicable fiscal years. Major tasks should have separate schedules that include decision dates, beginning/ending dates, and milestones;
- review schedule of networks for validity and compliance with requirements.

Operating Information System Specification (OISS)

An Operating Information System Specification (OISS) is generated for each OIS. The OISS is the design baseline from which individual development tasks, such as an application, are generated; it includes in one document package all technical design specifications needed for a single OIS. The review and evaluation of the OISS is therefore more technically oriented than that of other documents, and the level of detail varies for each system. It is extremely important, however, that MISD not be overly concerned with detail, but rather concentrate on judging the quality of the specification and on assuring that adequate preparations for producing a system are included.

Each OISS must be related to its predecessor documents. Because the situation that initially provided a system justification might have changed, it is necessary to verify the requirement definition and to build the review and evaluation of each OISS on this basis. Again, each system must be evaluated both on its own merits and from an AMIS perspective.

When a system design has been approved by MISD, the OISS supersedes the OISR as the system baseline. This approval represents the granting of authority to build the system, in accordance with project plans for accomplishment as approved. In evaluating the OISS prior to approval, MISD must consider the following questions.

- Will the system specified provide the information required?
- Do the results of cost-benefit analysis demonstrate the value of continuing development? Are life-cycle costs comparable with those for system development efforts of similar scope?
- Has the situation originally justifying the system altered significantly?
- Are the OISD requirements still valid?
- Does work to be accomplished by contractors conform to policy?
- Are security procedures adequate?
- Are data verification and editing procedures applied at the initial points of entry into system?

- Is configuration control provided for?
- Do quality control procedures provide for development, including audit trails, and control over data communication?
- Are plans included for discontinuance of systems no longer required?
- Is compliance with standards for documentation, programming, data elements, communications, etc., provided?
- Are provisions made for the additional workload at data processing installations that are not being provided additional capabilities for the system?
- Are plans included for necessary operating resources, including facilities, equipment, personnel, funding, consumables, etc.?
- Is action assigned for obtaining approval from the report control system?
- Is the OISS acceptable as a baseline design?
- Are system objectives defined in terms of design objectives?
- Is the Work Breakdown Structure complete?
- Are there time requirements, such as response times, that are critical to system performance?
- Is work expansion under mobilization or other work expansions taken into account?

Project Summary Reports and Project Management Reports

The Project Summary and Project Management Reports bring together progress and status data for each project/study. These reports are used by MISD not only to keep informed on the various developmental activities, but, more important, to identify problems that could hinder or prevent project accomplishment. Only the Project Summary Report is provided to MISD as a matter of course; the Project Management Report is provided on request, in situations calling for an additional level of detail.

Members of the MISD staff should examine the Project Summary Report to learn the variances and trends for projects/studies. The review criteria used are cost and time, with special importance attached to changes between planned and "actuals." Equally important are changes in trends. These can show the beginnings of problems, by disclosing the rate of increases in funds or time to complete projects as indicated during that reporting period, and, in addition, by revealing any acceleration of the increases over past reporting periods.

The reports identify key problems obstructing progress. However these problems and other report data cannot be examined absolutely; the evaluations must consider relative influencing factors. For example, the meanings of variances, which are basically estimates, differ according to the quality of the planning data. Assuming that these estimates, merely because they are "plans," are "requirements" can lead to an exaggerated effect. In addition, since the reports are submitted periodically, short-term fluctuations cannot always be regarded as potential trends; a reporting period is short in relation to the period over which a project accomplishes its tasks or the period over which bills are paid. On the other hand, a small variance as indicated in one report could be the "tip of the iceberg," revealing a potential problem that could be resolved by early corrective action. In this regard, the impact of slippage in one task upon another and upon the entire project must be considered during analysis.

It is of primary importance that reports be interpreted to obtain their true significance; overreaction at the level and political position of MISD can be harmful. If, after examination of the Project Summary Report, it is felt that a potential problem exists, the Project Management Report should be obtained. Because of the level of the problem with which MISD is concerned, time should be available for this. At the same time, however, personal contacts through telephone calls and visits are important in obtaining further explanations of and data about a problem area.

It is in this personal liaison with monitoring agencies and other project management organizations that MISD's position is most sensitive. The reporting of problems requires the cooperation and confidence of the project organizations, and the best way to ensure this is for these organizations to realize the benefits of reporting a problem as soon as it is detected, especially if it involves a shortage of resources. Although MISD does not directly control resources, the manner in which it makes its recommendations does affect their allocation.

Project Summary Report

In reviewing the Project Summary Report, MISD must:

- study the narrative statement and relate it to available data;
- determine meaning of variances by:
  - comparing the present report with previous reports;
  - relating percentages to absolute values;
  - determining the potential impact of variances on future project progress and completion;
- note potential shortages and action taken or required to relieve them;
- determine the meaning of trends by:
  - comparing the present report with previous reports;
  - deciding if an apparent trend might be only a temporary or insignificant fluctuation;
  - determining the impact of trends on future project progress and completion;
  - determining why circumstances exist that force deviations from plans;
- relate the data presented to previously known problems of cost and schedule and determine the nature of problems and causes and any potential effects they might have on performance;
- determine what, if any, other information is needed for analysis and decisions; obtain needed Project Management Reports; and locate other information sources;
- decide action needed to relieve problems by:
  - deciding how best to achieve desired results, such as intervention by Assistant Vice Chief of Staff, redirection of monitoring agency, reassignment of critical resources by owners, etc.;

- defining and clarifying the issues, focusing the attention of responsible managers on the problems at the lowest organizational level having authority to act, and giving support, coordination, and movement to ensuing actions.

Project Management Reports

The Project Management Report contains an expansion of the data provided in the Project Summary Report and is used in the same manner as that report. If the Project Management Report is required on other than a one-time basis for a given project, arrangements must be made with the System Manager.

Program Change Requests

MISD does not act on Program Change Requests (PCR), but, since they represent an important mechanism for obtaining resources, does retain an interest in the progress of these requests.

Application Specifications and Other System Documentation

The application specifications are the delivered products and, therefore, serve as indicators of project performance quality. These documents are examined for their quality, comprehensiveness, and adequacy. This examination cannot, of course, be considered as the sole indicator of performance. The prime performance criterion is whether or not the specification provides for all design requirements.

APPENDIX D

DRAFT AR 18-xx
MANAGEMENT INFORMATION SYSTEMS

This appendix contains a copy of AR 18-xx, an Army regulation prepared in draft form by Peat, Marwick, Livingston & Co. and submitted to the Management Information Systems Directorate on August 30, 1968. The page numbers of the original regulation have been changed here to identify the sections of the regulation as part of a total appendix to this document. Except for this, however, the regulation appears here exactly as it was originally prepared. This means that the table of contents on the following pages can be used only as reference for information contained in the regulation, not as an indication of the location of this information. In addition, references to sections of the regulation and to illustrations have not been changed from the original submission.

DRAFT AR 18-xx

MANAGEMENT INFORMATION SYSTEMS

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APPENDICES

Appendix A. Explanation of Terms

Appendix B. Instructions for Preparing Required Documentation

Appendix C. Change Procedure

Appendix D. Project Planning and Progress Reporting

SECTION I

GENERAL

1-1. Purpose

The purpose of this regulation is to set forth responsibilities and procedures for managing management information systems throughout their life cycle, including requirements definition, development, and operation and maintenance.

1-2. Objectives

a. The primary objectives of this regulation are:

(1) to provide effective information support to management functions at each command management echelon.

(2) to improve the utilization of scarce resources for systems development and maintenance in conformity with the priority of the management functions being served;

(3) to reduce the lead time from initial concept definition to implementation of management information systems; and

(4) to obtain maximum standardization of information system design and facilitate centralized programming.

b. These objectives will be attained through:

(1) clear statement and definition of information requirements at the outset;

(2) more effective participation of information users in the design and development process;

(3) continuous review and monitoring of technical progress through each phase of the system life cycle;

(4) estimation of resource requirements based on initial plans and continuous reestimation of cost-to-complete as the project progresses; and

(5) monitoring resource utilization through all phases of the life cycle.

1-3. Definitions

a. Guidance and Reporting System (G&RS). A structured set of information processing applications, gathering data at its source, transforming it to information, and delivering it to some information user or users, thus providing a basis for managerial action and downward transmission of guidance. A Guidance and Reporting System will ordinarily encompass several geographically or organizationally separated stages at which information is gathered, collated,

reduced, or otherwise processed. These stages are termed processing levels or reporting levels.

b. Application. A set of procedures including computer programs where appropriate, to solve a particular problem or set of problems.

c. Standard Application. A standard application is a computer supported application which is centrally designed and developed (including computer programming) for use at two or more DPI's.

d. Set of Standard Applications. A set of two or more standard applications developed centrally as part of a single project for use at two or more DPIs.

e. Independent Application. Any application which does not support a G&R System, whether or not it is centrally designed and developed. If centrally designed and developed for use at several DPI's, it may be termed a Standard Independent Application.

f. Data Processing System (DPS). A DPS is the set of applications at a given DPI.

g. Operating Information System (OIS). An OIS is the set of applications performing all the information processing for a given G&R System at a given reporting level.

h. Nonstandard Computer Supported Application. A nonstandard computer supported application is any application

supported by computer which has not been centrally designed and developed for use at several DPI's.

i. PCM Application. A PCM application is an application supported by PCM equipment and manual procedures.

j. Manual Application. A manual application is an application supported entirely by manual procedures.

k. Major Change (G&R System). Any modification to a G&R System which changes the information content of any output report, source document, or master file (format changes which do not affect content are excluded).

l. Major Change (Application). Any modification to an application which involves manpower utilization in excess of six in-house man-months or contractor man-months.

m. Scientific and Engineering Information System. An information system which has as its primary function the performance of mathematical computations and numerical analysis, and which does not produce reports in direct support of a Guidance and Reporting System.

n. System Specification Project. A planned undertaking to develop a Guidance and Reporting System Specification.

o. Application Project. A planned undertaking to develop an application, standard application, set of standard applications, etc.

p. Life Cycle. The period of existence of an information system. A logical sequence of phases through which a management information system must progress; extending from initial conception through development, operation, and maintenance, to final phase-out.

1-4. Scope

a. This regulation applies to:

(1) System specification projects to develop Guidance and Reporting System Specifications, reference Appendix B-3.

(2) Application projects to develop:

. standard applications

. sets of standard applications

. independent applications

. nonstandard computer supported applications

. data processing systems

(3) Major Changes (G&R System), reference paragraph 1-3k; and Major Changes (Application), reference paragraph 1-3l.

(4) Other changes to applications or G&R Systems, reference Appendix C.

b. This regulation does not apply to:

(1) Selection, acquisition, and disposition of ADPE (see AR 18-XX)

(2) Projects to develop scientific and engineering information processing systems, except where a project involves the development of both scientific and engineering information processing systems and management information systems, the provisions of this regulation are applicable to the entire project; and

(3) Projects to support information systems which are designated as part of the WWMCCS or IDHS.

SECTION II

RESPONSIBILITIES

2-1. Assigned Responsibilities

The following responsibilities for execution of this regulation are established as follows:

a. OAVCofSA, MISD

(1) approve the initiation of all system specification, and application projects of major changes/maintenance thereto;

(2) designate the MA and RDA;

(3) designate G&R System managers and application managers;

(4) act as MA for certain development projects; and

(5) assure overall coordination of plans and status of MIS development projects.

b. HQDA Staff Agencies

(1) act as system proponent for G&R Systems and applications originating at HQDA:

(2) act as MA or, if appropriate, RDA;

(3) recommend RDA;

(4) monitor MIS operations in functional area;

(5) insure resources implications related to G&R System Specification and Application

projects are adequately considered (training, manpower, personnel, communications, equipment, facilities) and being appropriately considered in program/budget decisions; and

(6) coordinate approval actions with OAVCofSA, MISD.

c. Major Commands

(1) carry out MA and RDA duties as assigned;

(2) insure coordination of system implementation at DPI's under command jurisdiction;

(3) assign development resources and support in accordance with project plans; and

(4) provide analytic data in response to system analysis and design requirements.

2-2. Assigned Roles

The following is an explanation of roles to be assigned by OAVCofSA in accordance with the provisions of this regulation.

a. System Proponent. The organization originally recognizing the requirement for a Guidance and Reporting System or any application. The system proponent is responsible for preparing the Letter of Intent IAW

paragraph 3-2. The system proponent of a G&R System will ordinarily be responsible for development of the requirements specification. The system proponent of an application may or may not be appointed RDA for the application project.

b. Monitoring Agency (MA). The agency assigned by OAVCofSA approval and monitoring responsibilities for development projects and monitoring responsibilities for operational information systems, to include:

(1) approval of G&RSS;

(2) approval of project plan, application design, application documentation, and test records;

(3) review implementation package;

(4) review progress report; and

(5) approval of change proposals.

c. Responsible Development Agency (RDA). The Army Major Command or other agency assigned responsibility for applications projects to include:

(1) performance of developmental tasks IAW Section III of this regulation;

(2) preparation of application project proposal, application design specification, application documentation, test plan and record, and implementation package;

(3) preparation of project plan and progress reports; and

(4) maintenance of application programs and procedures if so directed by OAVCofSA.

d. Guidance and Reporting System Manager. An individual or group assigned responsibility for monitoring and change control of a Guidance and Reporting System in the Operations Phase.

e. Application Manager. An individual or group assigned responsibility for monitoring, change control, and program maintenance of an Application in the Operations Phase.

SECTION III

LIFE-CYCLE PROCEDURES

3-1. General

This section describes the management information system life cycle, responsibilities, tasks, and reporting requirements. The set of required documents to be used for recording work outputs, maintaining continuity, and obtaining approvals as necessary, is included within a sequence of phases and constitutes a part of the significant work which must be accomplished during a life cycle. It is a purpose of this regulation to make the overlapping and interrelated phases discrete by specifying their tasks, documentation, and procedural requirements. These will provide a uniform structure and discipline needed to improve the management of undertakings to convert conceptual requirements into operational capabilities. In the remainder of this section, the life cycle is outlined in terms of phases, tasks, and documentation requirements. In order to provide for adjustment of procedural requirements to suit the particular system or project involved, all proposed development effort will be initiated by the submission of a Letter of Intent, describing the nature of the problem and the intended action. OAVCofSA will review the intended action, coordinate as required, and respond

with guidance prescribing the procedural requirements under Life-Cycle Management. Depending upon the size, scope, and significance of the project, exemption from various procedural requirements may be granted.

The life cycle consists of eight phases in which various documents are produced as integral parts of the work output. The phases include a problem analysis and statement phase, a system specification phase for guidance and reporting systems only, a set of application project phases, and an operations phase. These phases, together with the required documents are shown in Figure III.1.

3-2. Problem Analysis and Statement

In this phase, an information problem is analyzed, a problem statement prepared, and an intended course of action identified.

a. Primary Tasks

(1) identify problems and objectives;

(2) initiate problem/system analysis to determine causes of difficulties and examine alternate solutions;

(3) develop conceptual approach and preliminary plans for attaining objectives and resolving problems;

SCOPE		PHASE	DOCUMENT
All Projects		Problem Analysis and Statement	Letter of Intent
(G&R) System Specification Projects and Major Changes		Requirements Specification	Guidance and Reporting System Specification
Application Projects and Major Changes	Application Project Phases	Application Project Proposal	Application Project Proposal ——— Application Project Directive
		Application Design	Application Design Specification
		Program Development	Program Specification ——— Program and Application Documentation
		Test and Evaluation	Test Plan
		Implementation	Implementation Package
All Information Systems Under Life-Cycle Management		Operations Phase	Change Proposal ——— Letter of Intent

FIGURE III.1

(4) identify proposed course of action, including G&R System specification, application development, major change, etc.; and

(5) identify proposed reporting requirements for life cycle management, IAW the remainder of Section III.

b. Required Documentation - Letter of Intent

c. Responsibilities

(1) task performance - system proponent

(2) documentation

. preparation - proponent

. review - HQDA or commands as appropriate

. approval - OAVCofSA

d. Documentation Functions. The Letter of Intent is a statement of intent to develop a G&R System Specification or Application or a Major Change, using in-house or contract capabilities. This document is reviewed by OAVCofSA to identify the potential impact of the proposed action upon Army resources and on the Army Management Information System. OAVCofSA will provide guidance by letter, prescribing procedural requirements for Life-Cycle Management, depending on the nature of the proposed action. OAVCofSA will also appoint a Monitoring Agency,

or will assume the role itself. Figure III.2 shows for each action the organization which will ordinarily be assigned as Monitoring Agency.

3-3. Requirements Specification (G&R Systems Only)

In this phase, the requirements for information content and information processing are clearly stated to provide a basis for development of supporting applications. To preclude the possibility of inconsistencies among different data inputs due to different methods of data gathering or processing, the specification extends through each processing level (OIS) to the source of data.

a. Requirements Specification Phase

(1) Primary Tasks

(a) Develop concept and design of the G&R System and each OIS

(b) Specify in detail for each OIS

. data elements and codes

. data flow

. processing requirements

. system output reports and other products and services

. data sources

. data controls

(c) Prepare preliminary specification for application testing and evaluation

	ACTION	PROPONENT	MONITORING AGENCY
1.	G&R System Specification	HQDA Staff	OAVCofSA
2.	G&R System Specification	Major Command or Other	HQDA Staff Agency
3.	Standard Application	Any	HQDA Staff Agency
4.	Set of Standard Applications	Any	OAVCofSA
5.	DPS	Below Major Command	Major Command
6.	DPS	Major Command or HQDA	OAVCofSA
7.	Nonstandard Application	Any	HQDA Staff Agency (if not exempted)

FIGURE III.2

(d) Prepare draft of implementing directive

(2) Required Documentation

(a) G&RS Specification (GRSS)

(b) Draft Army Regulation or other directive

(3) Responsible Agencies

(a) Task Performance - G&R System proponent

(b) Required documentation

. prepare - proponent

. approve - OAVCofSA

(4) Documentation Functions. The function of the GRSS is to provide a statement of information content and processing requirements, to provide a sound basis for Application Development. OAVCofSA will review the GRSS and, upon approval, will prepare and forward to the system proponent a letter containing guidance for the preparation of Application Project Proposals, which will be endorsed by the system proponent and forwarded to RDAs. The draft regulation or other directive outlines the regulatory requirements for support of the system and will supplement the specification.

3-4. Application Project Phases

The remainder of the development phases are concerned with efforts to develop applications or sets of applications

(c) Application Project Directive

. prepare - MA

(4) Documentation Functions. The Application Project Proposal provides a brief description of the project, together with a development plan and preliminary technical description. It provides a basis for approval of the project and for monitoring development. The technical specification is preliminary and will presumably require some degree of change prior to submission of the Application Specification. The Application Project Directive functions as a charter to commence application development. It outlines design criteria, time and resource limitations, and other constraints under which the Application Project is to proceed.

b. Application Design

(1) Primary Tasks

(a) Perform detailed application design and finalize technical specification for application.

(b) Revise development plan as necessary in light of finalized technical specification, and report progress, reference Appendix D.

(c) Prepare plan for testing application.

(d) Identify required communications capabilities and specify application interfaces.

(2) Required Documentation

Application Design Specification

(3) Responsible Agencies

(a) Task performance - RDA

(b) Application Design Specification

. prepare - RDA

. approve - MA

(4) Documentation Functions. The Application Design Specification (ADS) provides a base line for program and procedure development. The technical specification must be prepared in adequate detail to permit "desk checking" (manual simulation) of the application logic. A detailed design review is conducted, with the participation of the MA to assure that the application will support the management information requirements it is intended to support.

c. Program Development. In this phase, computer programs, computer operating procedures, and all manual procedures are designed, developed (coded), tested, and documented.

(1) Primary Tasks

(a) Design and code programs

(b) Prepare procedures

(c) Test and debug programs

(d) Conduct application tests

(e) Prepare ADPE system specification IAW AR18-2 (if appropriate)

(2) (f) Report progress

(2) Required Documentation

(a) Program specification

(b) Program and application documentation

(3) Responsible Agencies

(a) Task Performance - RDA

(b) Application Documentation

. prepare - RDA

. approve - MA

(4) Document Functions. The application specification provides the basis for developing operable programs and procedures. After a detailed design review conducted with the MA, program specifications are prepared by the RDA, providing direct instruction to programmers. When programs have been coded and tested, the application specification, revised as necessary, together with the Program Specifications, revised as necessary, and Program Documentation, provide the basic elements for useful, maintainable

system documentation. They are combined to form the Application Documentation.

d. Test and Evaluation Phase. Once the programs have been successfully tested individually, it is necessary to conduct two further tests prior to beginning production on a regular basis. First, a System Test is conducted in which all programs are operated on a run-to-run basis, with all interfaces tested, using prepared test data. This is essentially a dress rehearsal. Following the System Test, a Pilot Test is conducted wherein the application is operated in a production environment using actual data and producing actual outputs. (Pilot Test may be conducted on a parallel basis with the current information system if appropriate.)

(1) Primary Tasks

(a) Conduct, in sequence

. System Test

. Pilot Test

to include for each test

. Finalize Test Plan

. Maintain Test Log

. Validate Output

. Evaluate Test

(b) Report Progress

(2) Documentation Functions. The RDA will coordinate with the MA the plan for the Testing Phase. The Test Record serves to record the test plan, plus a log of all starts, stops, errors discovered, and remedial action taken. When the System Test has been completed, the MA will review and evaluate this record and, upon approval, will authorize the RDA to commence the Pilot Test. When the series has been completed satisfactorily, the MA will forward to OAVCofSA an evaluation of the tests, together with the Test Records and recommendation for implementation. OAVCofSA will issue a letter directing preparation of the implementation package, or directing further testing or development effort.

e. Implementation Phase. When pilot testing has been successfully completed, the application is promulgated to the various DPIs which will operate it. The DPIs conduct local tests of the application and commence production, thus concluding the Application Project Phases.

(1) Primary Tasks

(a) ADPE acquisition and installation (if appropriate)

(b) prepare implementation package

(c) distribute implementation package

(d) report progress (reference Appendix D)

(e) conduct local application testing at DPI

(2) Required Documentation

Implementation Package

(3) Responsible Agencies

(a) task performance - Tasks a-d - RDA,

Task e - DPI

(b) implementation package

. prepare - RDA

. review - MA

. approve - OAVCofSA

4) Documentation Functions. The function of the implementation package is to promulgate the programs and procedures to the supporting DPI or other activities. Upon receipt of the implementation package, the DPI conducts local tests to assure local operability of the application.

3-5. Operations Phase

When the Implementation Phase has been completed, the project loses much of its identity, and the applications are operated at DPIs, supporting G&R Systems or local information requirements. However, further effort of a developmental nature may be required to correct latent program deficiencies, or to otherwise improve the system or application. A system or application manager is, therefore, appointed to assume responsibility for monitoring the on-going G&R System or application, and for change control (reference Appendix C).

a. Operations Phase

(1) Primary Tasks

(a) Produce services and information

(b) Change management

(c) Maintain computer programs and procedures

(2) Required Documentation

Change proposal; Letter of Intent

(3) Responsible Agencies

(a) Task performance: Task a - DPI, Task b - System/Application Manager, Task c - Application Manager

(b) Change Proposal

. Prepare - proponent of change

. Approve - MA

(c) Letter of Intent

. Prepare - System or Application Manager

. Approve - OAVCofSA

(4) Documentation Functions. The Change Proposal is used, in accordance with Appendix C, to put into effect those minor changes to programs or procedures which do not require substantial developmental effort, and do not effect information content of a system. Where a modification changes information content, or requires substantial developmental effort, it is to be considered a Major Change, subject to the Life-Cycle management process as prescribed in Section III and Appendix C.

APPENDIX A

EXPLANATION OF TERMS

To provide an explanation of terms for use in this regulation, it is necessary to start with a familiar term—application.

An application is a set of procedures, including computer programs where appropriate, to solve a particular problem or set of problems.

Initially the discussion will center about applications which support Guidance and Reporting Systems—an application is a set of procedures (computer, PCM, or manual) which support a reporting system at a particular DPI. There are other types of applications, which will be considered later.

A specific application can therefore be identified by specifying the Guidance and Reporting System it supports and the DPI at which it is located (operated). For example, Application 0002.S002 would identify the application to support the Five Year Troop Bases—Active Army, G&R System (0002) at HQUSCONARC S002.

There are, however, several other identifying attributes which can usefully be attached to this designation. First, the reporting or processing level at which the G&R System is repo[illegible] which will ordinarily but not

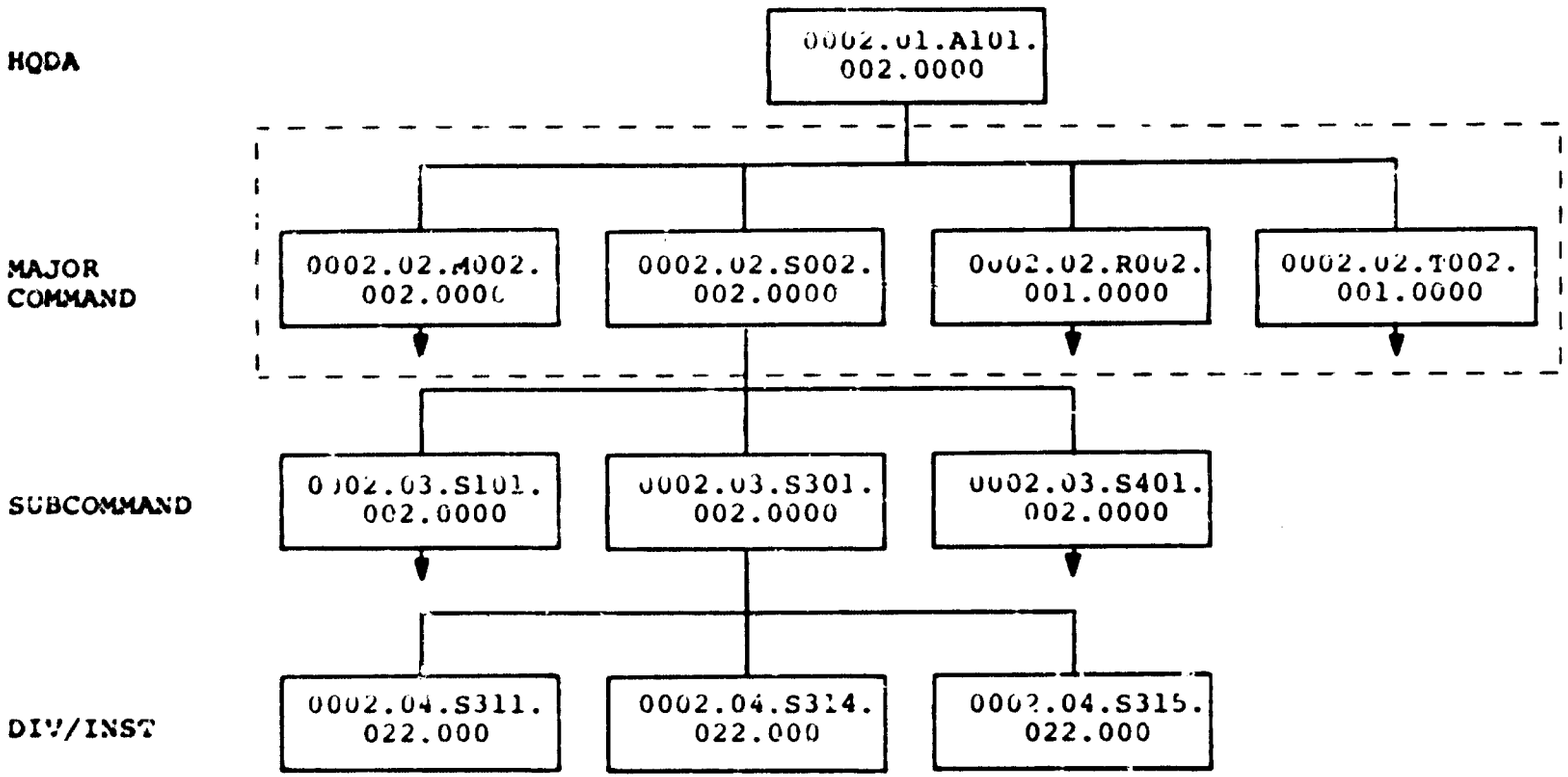
always be the organizational level of the DPI. Thus, for the above application, the designation 02 is attached to indicate the system is supported at the Major Command reporting level. This designation is inserted between the previous two, so that 0002.02.S002 identifies the applications to support the Five Year Troop Bases at the Major Command Reporting Level, at HQUSCONARC DPI.

It is also useful to know if the application is part of some "standard system" which has been centrally designed and programmed to operate at several DPI's—or if not, by what means the processing is accomplished; i.e., nonstandard computer application, PCM, or, in some cases, manual support.

As shown in the list of codes in Figure A.1, non-standard computer procedures are identified by the code 002, which is placed to the right of the other codes, so that 0002.02.S002.002 would represent the same HQCONARC application, as previously noted, and would indicate that the application consists of nonstandard computer procedures.

Finally, in order to provide identification for those applications which are not directly in support of G&R Systems, an additional code is attached to indicate subject area, such as Facilities Inventory (0133), Motor Vehicle Registration (0196), Dependent Medical Care Program (0194), etc. This code is only used when no G&R system is supported, so that 0000 will be entered in the G&R

GUIDANCE AND REPORTING SYSTEM 0002+



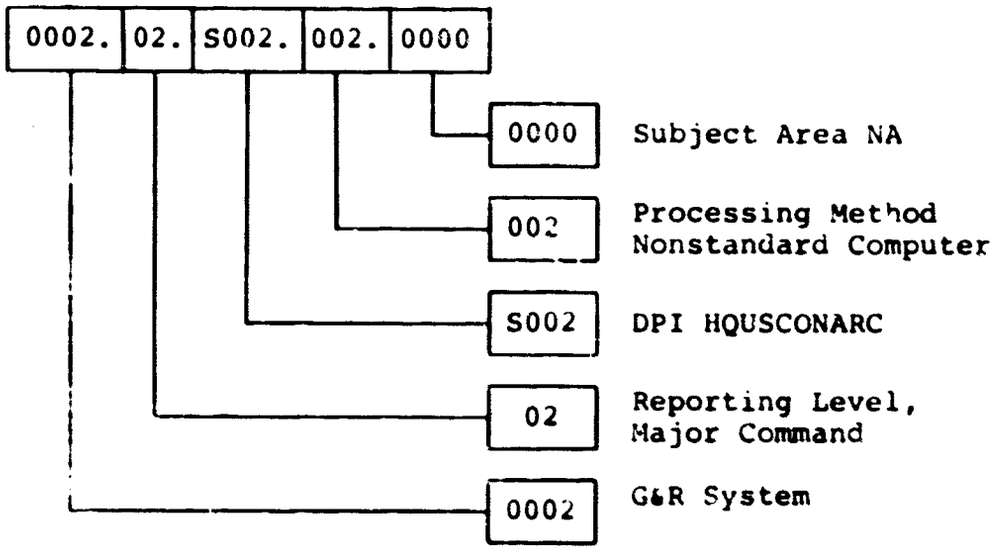
+ Arrow ⬇ indicates application or sets of applications not shown

* See explanation, page A.8

FIGURL A.1*

System code position. Conversely, if a G&R System is supported, the subject area code will be 0000, so that 0002.02.S002.0000 represents the previously referenced HQCONARC application to support the Five Year Troop Bases. On the other hand, the application for Motor Vehicle Registration would be numbered (note that reporting level is 000 or not applicable) 0000.02.S002.000.0196.

Thus, any application may be identified by a five part number, as follows.



It is possible to provide a number of other identifications for purposes of this regulation.

Guidance and Reporting System (G&RS)

A G&R System is identified as the set of applications bearing a given G&R System number.

Operating Information System (OIS)

An OIS is the set of applications performing all the information processing for a given G&R System at a given reporting level. An OIS is identified as the set of applications bearing a given G&R System number and a given reporting level number.

Data Processing System (DPS)

A DPS is the set of applications at a given DPI. A DPS is identified as the set of applications bearing a given DPI number.

Standard Application

A standard application is a computer supported application which is centrally designed and developed (including computer programming) for use at two or more DPI's. Thus, a standard application is identified as the set of applications bearing a given "processing method" number other than 000 (manual), 001 (PCM supported), or 002 (nonstandard computer supported).

Nonstandard Computer Supported Application

A nonstandard computer supported application is identified as any application bearing processing method number 002.

Manual Application

A manual application is identified as any application bearing processing method number 000.

PCM Application

A PCM application is identified as any application bearing processing method 001.

Independent Application

Any application which does not support a G&R System. An independent application is identified by the G&R System number 0000 and by a non-zero entry in the subject area position.

Set of Standard Applications

A set of two or more standard applications developed centrally as part of a single project for use at two or more DPIs.

The following illustrations provide examples of the above identified terms.

APPLICATION CODES

(For illustration purposes only, not to be used in referring to actual applications. Reference TB 18-X, "Application Identification Code List," for actual codes.)

G&R Systems

0000	Independent Application - No G&R System
0002	Five Year Troop Bases, Active Army
0005	Civilian Pay

Reporting Levels

01	HQDA
02	Major Command
03	Subcommand
04	Division/Installation

DPI's

A101	HQDA (USAIDSCOM)
M002	USAREUR
R002	USACDC
S002	HQUSCONARC
T002	USAMC
S101	HQ 1st U.S. Army
S301	HQ 3rd U.S. Army
S401	HQ 4th U.S. Army
S501	HQ 5th U.S. Army
S311	U.S. Army
S314	U.S. Army Garrison, Ft. Gordon, Georgia
S315	U.S. Army Garrison, Ft. Jackson, Florida

Processing Methods

000	Manual
001	PCM
002	Nonstandard Computer Supported
022	COCOAS

Subject Areas (for Independent Applications)

0097 Facilities Inventory

0127 Motor Vehicle Registration

0342 Dependent Medical Care Program

Explanation of Figure A.1

Applications

Each numbered box, e.g., 0002.03.S101.002.0000 represents an application.

G&R System

G&R System 0002 (Five Year Troop Bases, Active Army) consists of all applications shown (not that all are identified by 0002 in first position), as well as certain applications omitted for lack of space, as indicated by downward arrow (↓).

Operating Information System

OIS 0002.02 consists of all the applications supporting G&R System 0002 at the Major Command (02) reporting level. Thus, OIS 0002.02 consists of applications:

0002.02.M002.002.000

0002.02.S002.002.000

0002.02.R002.001.000

0002.02.T002.001.000

Similarly, OIS.0002.01 consists of the one application supporting G&R System 0002 at HQDA level, namely 0002.01.A101.002.000.

OIS 0002.03 consists of applications

0002.03.S101.002.0000

0002.03.S301.002.0000

0002.03.S401.002.0000

which are the applications with G&R System 0002 at the subcommand level, plus all the applications omitted from the illustration which would support G&R System 0002 at the subcommand level within other major commands (other than CONARC). This would include

0002.03.M101.002.000,

0002.03.M201.002.000, etc.

Standard Application

Applications

0002.04.S311.022.000,

0002.04.S314.022.000, and

0002.04.S315.022.000

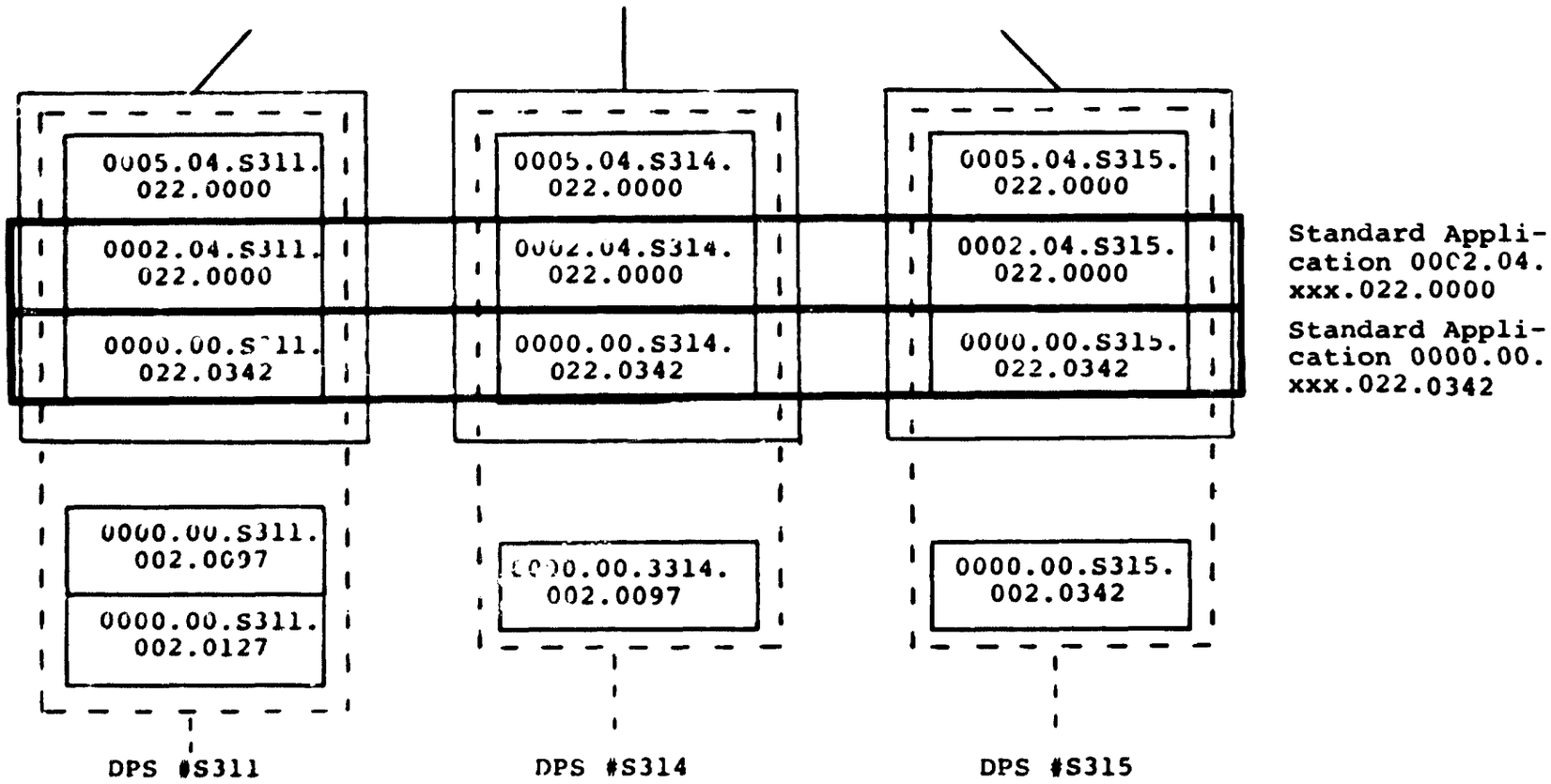
are standard applications, as they support the same G&R System (0002) at the same reporting level (.04), using the same processing method (022). A second type of standard application is shown in Figure A.2, where independent applications

0000.04.S311.022.0342,

0000.04.S314.022.0342, and

0000.04.S315.022.0342

have the same processing method and are in the same functional area. This latter standard application may also be termed "Standard Independent Application."



*See explanation, page A.12

FIGURE A.2*

SET OF STANDARD APPLICATIONS 022 (COCOAS)

Explanation of Figure A.2

Data Processing System (DPS)

Each of the boxes composed of dotted lines comprises a data processing system—the set of applications at a given DPI. Thus, DPS S311 consists of applications

0005.04.S311.022.0000

0000.00.S311.022.0342

0002.04.S311.022.0000

0000.00.S311.002.0097

0000.00.S311.002.0127

Standard Application

As in Figure A.1, standard application 0002.04.xxx.022.0000 consists of applications

0002.04.S311.022.000

0002.04.S314.022.0000

0002.04.S315.022.0000

Set of Standard Applications

A set of standard applications consists of two or more standard applications developed centrally as part of a single project for use at several DPI's.

All the applications within the larger solid-lined boxes comprise a set of standard applications consisting of:

Standard Application 0002.04.xxx.022.0000

Standard Application 0005.04.xxx.022.0000

Standard Application 0000.00.xxx.022.0342

APPENDIX B

INSTRUCTIONS FOR PREPARING REQUIRED DOCUMENTATION

B-1. General Instructions

There are two types of instructions in this appendix:

a. instructions for documents with document formats and contents specified; and

b. instructions for documents for which only the minimum contents are described.

B-2. Letter of Intent

Identify the problem analyzed, and the proposed action and objectives as well as anticipated in-house or contract resource requirements (gross estimate).

B-3. Guidance and Reporting System Specification (GRSS)

a. Format

(1) Identification

(a) system title

(b) system number (as assigned by OAVCofSA)

(c) agency submitting G&RSS

(d) reference to original Letter of Intent

. date and proposed title

. agency submitting

(e) reference to directives

(f) functional areas of information requirements

(g) proposed MA for supporting applications

(2) Background

(a) basic directives

(b) general

(3) System Description

(a) objectives of system

(b) functions to be supported

(c) scope

(4) Supporting Organizations

(a) Army elements

(b) DPIs

(c) System Overview Chart

(5) Information Content

(a) information and data elements

(b) data sources

(c) data flow chart

(6) Other General Comments

(7) OIS Specification

(a) source data groups

(b) master file descriptions

(c) input/output and report specification

(d) gross processing logic required—
manual or machine

(8) Development Approach for Applications

b. Specific Instructions. The following instructions are keyed to the item numbers in Figure B-3a.

Item 1. Identification

Item 1a. System Title. Self-explanatory.

Item 1b. System Number. OAVCofSA will assign a system number on responding to the Letter of Intent.

Item 1c. Agency Submitting. Self-Explanatory.

Item 1d. Letter of Intent. Self-explanatory.

Item 1e. Reference to Directives. Reference related directives, whether or not they are also included under 2(a).

Item 1f. Functional Areas of Information Requirements. Enter functional areas (finance, logistics, etc.) in which the proposed G&R System will provide service.

Item 1g. MA. Enter name of HQDA staff agency or other agency proposed by the submitting agency to be MA for supporting application projects.

Item 2. Background

Item 2 . Directives. Enter titles and numbers of Army directives, including draft directives so identified, which will support the G&R System.

Item 2b. General. Describe background and events leading to recognition of information requirement. State why the requirement exists, relating it to organization

missions and functions. If requirement is currently supported or satisfied in full or in part by an existing information system, describe changes in environment or inadequacies of current system which make it unsatisfactory for continued use.

Item 3. System Description

Item 3a. Objective of System. State objective of system or system improvement.

Item 3b. Functions to be Supported by the Proposed System. This system will support the following functions: State what the products of the system will be used for in terms of functions supported—e.g., monthly review of expenditures for civilian pay.

Item 3c. Scope. State scope of system, i.e., information functions encompassed at any processing level—e.g., time and attendance records for pay purposes. State the extent of changes to present procedures and information systems.

Item 4. Supporting Organizations

Item 4a. Army Elements. Enter the Army organizations which will be required to perform information processing functions within this system. This will include:

. data observation and recording

. manual preparation of reports

. automated preparation of reports

. receipt and utilization of reports

. other functions within the system

Item 4b. DPIs. Enter the DPIs by number which will perform data processing within the proposed system, in support of the above organizations.

Item 4c. System Overview Chart. Provide a chart similar to the example shown (Figure A.3), portraying each application, the applications to which it provides data or from which it receives data, and an indication of the OIS specification which each DPI will support, by reference to the part of Section 7 (A, B, C, D, etc.) specifying the OIS. Identifying codes in applications will be provided including at minimum G&R System Number, Processing Level, and DPI number (Ref TB18-x).

Item 5. Information Content

Item 5a. Information and Data Elements. Enter the information and data elements or data element groups which will be observed, recorded, processed, and reported within this system (e.g., civilian employee identification, hours worked by week, absences, and leave).

Item 5b. Data Sources. Enter the original operational sources of data for the proposed system, by data element or group. If data is not gathered at source within this G&R System, but is obtained from other information systems,

describe the method of operation of other systems up to the point where data or information enters the proposed G&R System.

Item 5c. Data Flow Chart. Flow chart, illustrating flow of data from source, through typical reporting organizations for each processing level to final information user. Show interfaces with other G&R Systems. Use flow chart symbols as per AR 18-7. State briefly the processing to be accomplished by DPIs. State the communication media to be employed.

Item 6. Other General Comments. Self-explanatory.

Item 7. System Specification (Separate section for each OIS)

Item 7a. Source Data Groups

. Enter source of data. (If not collected at operational source, identify source of data in other information system and reference Item 5b.)

. Enter method of observing and reporting showing source document format and general instruction for preparation.

Item 7b. Master File Descriptions. Enter content, record format, and sequence.

Item 7c. Input-Output and Report Specifications. Include specifications of tape or card files transmitted between processing levels, as well as any printed reports.

. Enter content—information items contained.

. Enter format of records—show sample formats IAW AR 18-7.

. Enter sequence.

Item 7d. Processing Required.

. Include flow chart and narrative for gross processing logic.

. Include required data controls, e.g., record counts; also backup files required.

Item 8. Development Approach. Indicate for each DPI or set of DPIs how it is anticipated that the applications will be developed (whether through individual development projects, on-going standard application projects, new standard application projects, etc.).

B-4. Application Documents

The remaining documents apply to all application projects, including DPS projects, standard application projects, and projects to develop sets of standard applications. The outlines and instructions below will, therefore, be modified as necessary to encompass the particular type of project involved. Specifically, it is anticipated that within the Application Project Proposal all items except Item 6—Project Plan, will be replicated for each application within the project. Similar items in later documents will also be replicated in this manner.

B-5. Application Project Proposal

a. Format

(1) Identification

(a) title and number of application

(b) submitting agency

(c) MA

(d) RDA

(e) project manager

(f) G&R System or functional area supported

(2) Background

(a) applicable directives

(b) general background

(3) Application Concept

(a) objectives

(b) scope

(4) Guidance and Reporting System Overview

(if appropriate)

(5) Functional Description

(a) planned products and services

(b) planned inputs

(c) planned data flow

(d) performance requirements

(6) Project Plan

(a) project plan

(b) organization and responsibilities

b. Specific Instructions. The following instructions are keyed to the item numbers in Figure B-5a.

Item 1. Identification. Self-explanatory.

Item 2. Background

Item 2a. Applicable Directives. Enter Army directives supporting requirement for application. Include regulations prescribing G&R Systems to be supported.

Item 2b. General Background. Describe events leading to recognition of need to develop application.

Item 3. Application Concept

Item 3a. Application Objectives. State objectives of application, in performance terms if possible, e.g., reduce requisition turn-around time to less than four hours.

Item 3b. Scope. State scope of application; that is, state information functions encompassed, e.g., all civilian manpower management functions except daily time and attendance records for pay purposes.

Item 4. Guidance and Reporting System Overview. Brief description of any G&R Systems supported, showning place and role of application proposed. A flowchart with explanation will be included. This information should be extracted

from the approved G&R System Specification (Item 4c).

Item 5. Functional Description

Item 5a. Planned Products and Services. What the application as a whole is to produce; relate to performance requirements. List major outputs of the system. Include:

. reports, periodic and unscheduled;

. files maintained;

. other services provided, for instance, handling of ad hoc queries; optional features, and other significant functions.

Item 5b. Planned Inputs. Enter:

. data - content, format, limits, accuracy, precision, media, sources, methods of collection, and mechanization;

. files - content, format, structure, keys, media; and

. communications - media, etc.

Item 5c. Planned Data Flow. Flowcharts showing flow of information and processing logic from input to output for the application.

Item 5d. Performance Requirements. State assumptions, constraints, details for performance, service, and functional goals. Relate to G&RSS. Quantify where possible.

Item 6. Project Plan

Item 6a. Project Plan. List tasks and milestones to be accomplished, specifying end products, in accordance with Appendix D. Supplement as necessary to clearly outline plan.

Item 6b. Organization and Responsibilities. State which organizations and individuals are responsible for accomplishing which tasks, show overall organization structure, including MA, RDA, and project manager.

B-6. Application Design Specification

a. Format

(1) Identification

(a) title and number of OIS

(b) submitting agency

(c) MA

(d) RDA

(e) project manager

(f) G&R System or functional area supported

(2) Background

(a) applicable directives

(b) general background

(3) System Concept

(a) objectives of system

(b) scope

(4) G&R System Overview

(5) Functional Description

(a) products and services

(b) planned inputs

(c) planned data flow

(d) performance requirements

(6) Revised Project Plan

(7) Technical Specification

(8) Outline of Anticipated Documentation Package

(9) Communications

(10) Preliminary Test Design

b. The following instructions are keyed to the item numbers in Figure B-6a. Items 1 - 6 are extracted from the application project proposal and modified to reflect any changes which have occurred since the previous submission.

Item 7. Technical Specification. List here the equipment, language, organization, interfacing considerations, input/output lists, intermediate results, files, operating procedures, quality controls, and error procedures. If ADPE system specification is required in accordance with AR 18-2, the application description prepared as directed in AR 18-2 paragraph 6300 - 6307 will satisfy this requirement.

Item 8. Outline of Anticipated Documentation. Package list here the items of documentation which are to be provided along with the system; provide outlines of the contents of each. Reference Figure B7 through B9 for minimum contents.

Item 9. Communications. State the communications methods, media, volumes, and systems which are to be employed. Include interface characteristics for use with other systems.

Item 10. Preliminary Test Design. Present preliminary design for testing, validation, and acceptance of system.

B-7. Application Development Documentation

a. General Instruction. The application development documentation is to be prepared as directed by the appropriate project manager. The outline below represents minimum acceptable content of such locally prescribed specifications.

b. Outline - Application Specification

Item 1. Introduction to Application

Item 2. Application Narrative and Process Flow Chart

Item 3. Input-Output Data Specifications and Sample Forms

Item 4. Data Handling and Control Procedures in Detail

Item 5. Error Correction Procedures

Item 6. Summary of Programs

Item 7. Master File Descriptions

Item 8. Table Descriptions (Internal Tables) Common to Application

Item 9. Input, Output, and Files Grid Chart

Item 10. Storage Allocations

Item 11. Revision History

c. Outline - Program Specification

Item 1. Introduction to Program, Describing Program Function

Item 2. Preliminary Flow Chart and Narrative, Showing Interfaces with Other Programs

Item 2. Preliminary Flow Chart and Narrative, Showing Interfaces with Other Programs

Item 3. Program Logic

Item 4. File Descriptors for All Except Working Files Internal to Programs

Item 5. Layouts of Forms and Reports

d. Application and Program Documentation. Application and program documentation consists of application specifications and program specifications as updated during programming and testing, with the following outputs of the programming process added.

Item 1. Source Language Listing and Machine Code Listing

Item 2. Memory Layout

Item 3. Sample Printouts

Item 4. Test Data and Results

Item 5. Description of Internal Program Tables

Item 6. Notes, Comments, Cautions, etc.

Item 7. Operating Instructions

(a) application segment chart, showing relationship of program to other programs

(b) operating instructions (call messages, tape mounting instructions, control cards, form setup, etc.)

(c) normal halt list and restart procedures plus error halt list and restart procedures

(d) data disposition instructions

B-8. Test Record

a. Contents. The test record will consist of

(1) Test Procedure Description. A description of the testing procedure, summarizing the original test plan, identifying critical testing points, and indicating any variations from the anticipated result.

(2) Test Log. A detailed chronological record of the test, showing starts, stops, errors discovered, corrective action taken, and other operational occurrences. This log should be maintained during the actual test period, at the testing site or sites.

(3) Test Data Sets. A complete set of test data used for input, in hard copy form, together with all outputs, also in hard copy.

(4) Test Evaluation Summary. A brief evaluation of the test, together with identification of anticipated problems in further testing or in system operation.

B-9. Implementation Package

a. Content. The implementation package consists of the following:

(1) complete system documentation, including application and program documentation. At the discretion of the MA, certain program listings may be omitted.

(2) separate operating instructions.

(3) identification of points of contact for inquiries, change proposals, etc.

(4) a complete set of test data and results, together with instructions for conducting a local system test to assure correct local implementation.

(5) guidance for transition and production start up.

B-10. Application Project Directive

a. Content

(1) Identification. Identify application by title, number, classification, and other related identifying information.

(2) Responsibilities. Identify or assign responsibilities, roles, and tasks within life cycle.

(3) Design Criteria. Specify design and development parameters; identify systems with which the designated application must be compatible; identify legal, policy or procedural constraints; state special characteristics such as response times; direct the use of specific programming languages, standard data elements and codes, source data automation and other technical design features as appropriate.

(4) Scheduled Actions and Time-Phasing. List task accomplishment and resource schedules.

(5) Special Instructions. Include pertinent special instructions on further reviews required by HQDA; resource identification; and the form, content, and frequency of progress reports.

APPENDIX C

CHANGE PROCEDURE

This appendix specifies a basic procedure for coordination and control of changes to Management Information Systems.

C-1. General

Changes to Operational G&R Systems and Applications are considered for control purposes to be of two primary categories: Minor Changes, and Major Changes. The category of Minor Changes includes all corrections to remedy program deficiencies, and other changes to procedures which do not affect information contents of a Guidance and Reporting System; provided resources required for developing such changes are capable of being absorbed within the normal operational capabilities of the responsible organization or resources have been specifically allocated for changes and modifications and do not exceed six man-months of effort. Other modifications are to be considered Major Changes, subject to Life Cycle Management Requirements, beginning with the Letter of Intent IAW paragraph 3-2; although OAVCofSA may grant exemption from later life cycle procedural requirements in the event the change is capable of being implemented within the Minor Change Procedure.

The Change Procedure will therefore operate in the following manner:

C-2. Change Proposal.

In the operations phase, the procedure for changing an application or G&R System will begin with preparation of a change proposal form. The proponent of a change will fill out the change proposal form shown in Figure C-1 as follows:

Block 1 - enter system title

Block 3 - enter date

Block 4 - enter proponent's name and organization

Block 5 - describe change being proposed

Block 6 - describe justification for change

The form will be submitted to the appropriate system manager or application manager. The system/application manager will enter the change proposal number in Block 2, and will review the proposal.

If the change is clearly to be considered a Minor Change, he will determine or approve changes to programs or procedures to be made, and insure that the change is coordinated with other related G&R System managers and application managers as appropriate. He will then publish or otherwise promulgate the necessary change.

If the change is a Major Change, or if its status is questionable, the manager will prepare and submit a Letter of Intent IAW paragraph 3-2.

C-3. Developmental Changes

The project manager is responsible for providing formal control over changes during the development segment. His procedures must insure design and system integrity. The change proposal form (Figure C-1) may be used for project change purposes, at the discretion of the project manager.

CHANGE PROPOSAL

1. System Name _____

2. Change Number _____ 3. Date: _____

4. Proponent of Change: _____

5. Change Description:

6. Justification for Change:

FIGURE C-1

APPENDIX D

PROJECT PLANNING AND PROGRESS REPORTING

D-1. General

In accordance with paragraph 3-4a, a detailed plan for the application development is submitted with the application project proposal. Thereafter it is revised as necessary, and progress reported concurrent with the submission of each document prescribed in paragraphs 3-4b - 3-4e, or as otherwise directed by the MA. The basic format of the planning document and progress report (same form) is shown at Figure D.1. This will be supplemented as deemed appropriate by the RDA or as directed by the MA.

D-2. Milestones

The completion of each required document IAW paragraph 3-4a - 3-4e constitutes a project milestone. Where the project is to develop several applications, such as a data processing system or a set of standard applications, a milestone will be scheduled for the completion of each document for each application for planning and for reporting purposes.

D-3. Explanation of Figure D.1

The Project Plan and Progress Report shown at Figure D.1 will be prepared as follows:

PROJECT PLAN AND PROGRESS REPORT

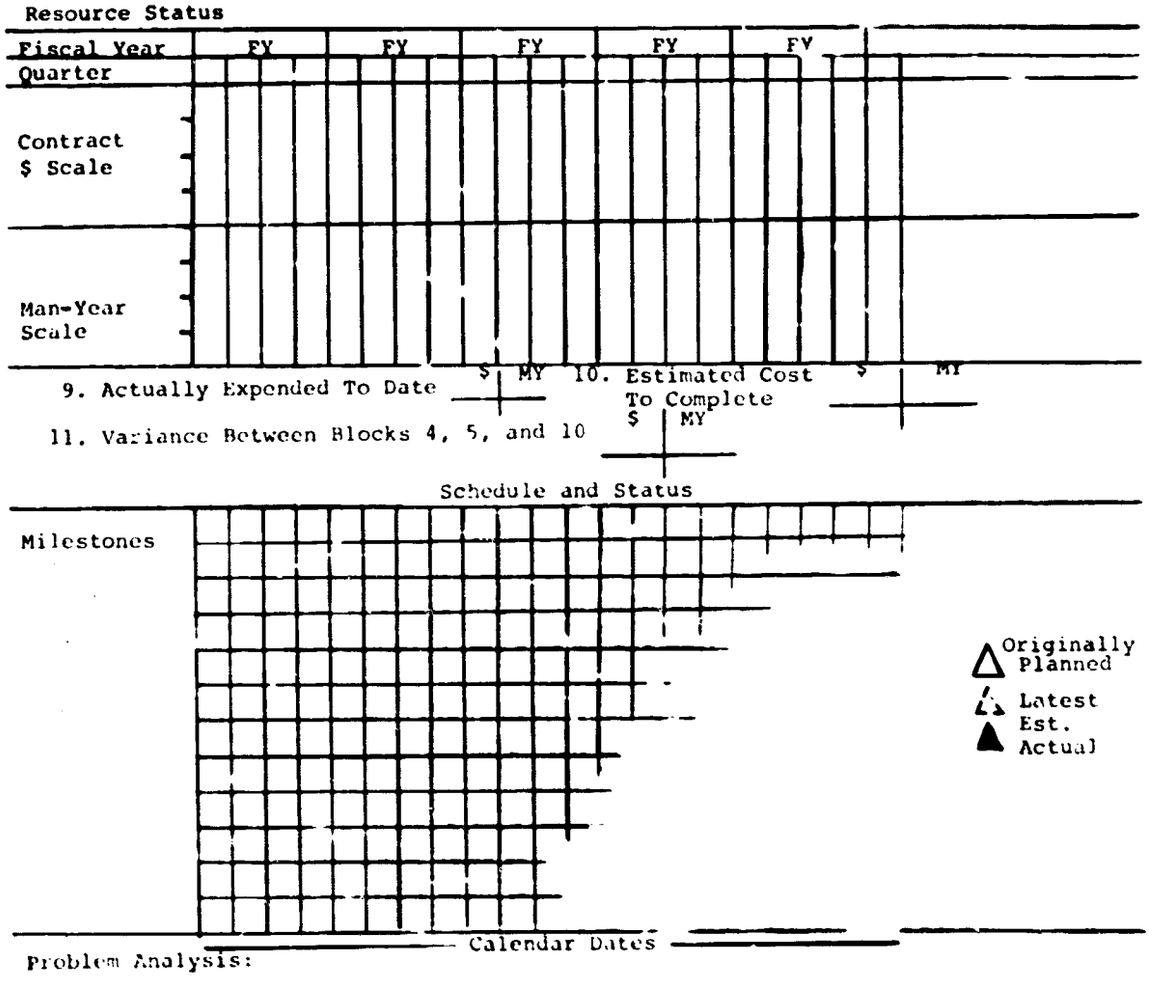
Project Description

1. Project Title _____ 2. Year _____ 3. Quarter _____

4. In-House Man-Years _____ 5. Contract Cost _____

6. MA _____ 7. RDA _____ 8. PM _____

Resource Status



Problem Analysis:

FIGURE D.1

a. Under the project description section, the following information will be entered in the appropriate block:

(1) project title

(2) calendar year (of report)

(3) quarter (of report)

(4) total planned in-house man-years

(5) planned total dollar cost of contracts

(6) monitoring agency

(7) responsible development agency

(8) project manager in charge of the project

b. In the resource status section, planned and actual resource information will be portrayed graphically and in tabular form. A dashed line will graphically portray the planned resource expenditures by quarter for the life of the project. The actual resource expenditures will be shown on the same scale, as a solid line. Tabular information will be summarized in the blocks in man-years and contract dollars.

c. In the schedule status section, the project milestones will be portrayed in terms of planned date, latest estimates and actual completion; using triangles, dotted triangles, and solid triangles respectively.

d. The problem analysis section will provide a brief description of major problems affecting cost, schedule, or

performance of the project and action taken or needed to resolve them. It will also identify any milestones, for which the estimated completion dates have changed since the last submission of a progress report.