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Lessons learned about ..

**ACQUIRING FINANCIAL
MANAGEMENT & OTHER
INFORMATION SYSTEMS**

August 1976

**MANAGEMENT INVOLVEMENT
IN:**

- PLANNING
- CONTRACTING
- DESIGNING
- DEVELOPING
- TESTING
- IMPLEMENTING
- OPERATING



**BY THE
COMPTROLLER GENERAL
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FOREWORD

In most Federal departments and agencies, managers involved in planning, executing, and evaluating programs rely heavily on computer-based management information systems for decisionmaking. Departments and agencies not only must acquire and maintain these systems, especially the financial management information systems, but also, as federal programs become larger and more complex, must design and develop new systems to provide the essential information needed for program control, evaluation, feedback, reporting, and day-to-day management.

Often, however, agencies lack the number of skilled professionals necessary to accomplish the large, one-time development of such systems. In this situation, the agencies frequently contract with the accounting and management consulting firms, which can give the Government valuable, prompt help in designing, developing, and implementing the systems.

Federal agencies' experiences with contracting for financial and other systems development have varied. All too frequently, the systems have not satisfied agency information needs, were more costly than anticipated, or failed to meet scheduled implementation dates. But many agency-contractor efforts have met system concept, design, implementation, and operation objectives, while keeping agency costs reasonable and creating a smoothly functioning system.

GAO'S INTEREST IN COLLECTING LESSONS LEARNED

GAO is responsible for (1) approving and (2) reviewing in operation, accounting systems of the executive agencies. As it reviews the systems, GAO is increasingly concerned not only that the systems produce accurate data in accordance with prescribed principles and standards, but also that the information produced is accepted and used by operating managers. Actual use is the ultimate test.

In approving and reviewing Federal agency accounting systems—many of which are designed and developed with contractor assist-

ance—GAO noticed common problems and difficulties which are not being systematically documented so other agencies could learn how to avoid them. Similarly, there was no mechanism for telling others about successful practices.

BOOKLET PURPOSE

We prepared this booklet to disseminate the lessons learned by many Federal agencies and contractors in designing, developing, and implementing management information systems. Although we were initially interested in the agencies' development of their accounting systems, it became apparent that the lessons apply to the development of all types of management information systems.

COLLECTING THE LESSONS

We interviewed officials of many Federal agencies, civilian and military, to learn of their experiences and gain insight into the contracting and development processes. Senior members of accounting and management consultant firms and professional accounting and management societies and organizations also contributed their experiences and perspectives. The Office of Federal Procurement Policy, the General Services Administration, and project managers of the Joint Financial Management Improvement Program provided expertise on specific Government policies, practices, and regulations.

After we had collected the lessons, we prepared a draft booklet and obtained comments on it from each official interviewed. We conducted six conferences with agency officials and firm managers and partners. We also solicited comments from the American Institute of Certified Public Accounts. (See back cover for contribution sources.)

BOOKLET USE

The chapter format divides the complex contracting and development process. Chapters 4 and 5 assume that an agency has decided to use a contractor to develop its computer-based system. However, if an agency decides to design, develop, and implement a

system in house, lessons about defining the problem and planning for system change (ch. 3) and contractor/agency performance (ch. 6) are still applicable. Throughout the booklet, we assume that the system to be developed will be computer-based.

The scale of system development efforts vary greatly in complexity, size, scope, and cost. Officials and contractors constantly emphasized scale when determining which lessons to apply. When large systems are acquired, each guidance item may be important.

We hope that this synthesis of guidelines for the acquisition of management information systems, particularly financial management systems, will be useful not only to Federal agencies, but also state and local governments and accounting and management consultant firms that assist government agencies and others in designing, developing, and implementing systems.

A handwritten signature in black ink, appearing to read "James A. Attest". The signature is fluid and cursive, with the first name "James" being more legible than the last name "Attest".

Comptroller General
of the United States

August 2, 1976

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ABBREVIATIONS

GAO	General Accounting Office
RFP	Request for proposal

CHAPTER 1

OVERVIEW

Agency and contractor officials stated that considering certain lessons is essential to successfully develop a system. These lessons are discussed in this overview and are referenced to 68 guidance items.

The referenced guidance items are discussed in detail in chapters 3 through 6. We have also provided a list of guidance items 1 to 68 in appendix I as a reference document.

Appendix II is a matrix of organization or individual responsibilities for each guidance item. Recognizing variations in department and agency organizations and responsibilities, we present this matrix as a departure point for assigning responsibility for each guidance item.

COMPLETE PROBLEM DEFINITION

The most important step in developing a system is determining its requirements. Not only must problems be identified and defined, but key agency officials must agree on the problems defined and the scope of the system needed. Contractors and agency officials state that often too little time and effort are devoted to preparing statements identifying and documenting problems with the current system's products and processes. Agency management, system development groups, and user groups must participate to develop complete statements of current problems and new requirements.



For example, if an agency is planning for the development of a new financial management system, it should involve its accounting office in defining the problem and determining system requirements. If the user group is excluded from defining the problem, the definition will probably be incomplete or unacceptable to the user group. Basing contracted development on such a problem definition may result in a system which is not implemented or which does not meet the accounting office's information requirements.

The task of defining problems is continuous. As problems and requirements are defined and refined through communication, coordination, and agreement, a series of planning documents is generated:

1. An initial statement of user requirements.
2. A priority requirement statement.
3. A detailed work statement.
4. A request for proposal (RFP).
5. Contract and contract amendments.
6. Final system documentation.

(See related guidance items 1, 5, 20, 21, and 50.)

WELL-QUALIFIED AND EFFECTIVE PROJECT COORDINATOR

Many agencies and contractors view the project coordinator as the most important individual in system development and implementation. The project coordinator should be selected early and be a well-qualified agency official. He or she should be committed to the system change and have the full support of upper management.

The project coordinator must know the agency and its problems and be in contact with decisionmaking officials. He or she must be able to gather and maintain the necessary agency resources and

talents to select, aid, monitor, and direct the contractor in designing, developing, and implementing the system.

The project coordinator's functions and duties are so crucial to the success of the project that they should be documented in a charter. The coordinator's relationship to other agency officials and the contractor should be clearly defined, and any limitation on decisionmaking authority should be explained. *(See related guidance items 11 and 12.)*

CONTINUOUS COMMUNICATION AND COORDINATION

System procurement is complex—many individuals and organizational elements are involved and affected. If the communication system does not provide continuous opportunity for input and changes, necessary information will be left out. Decisions, commitments, and positions must be coordinated within the agency during planning and contracting.



After the contractor begins to design and develop the system, coordination between agency and contractor personnel becomes critical. The project coordinator and team are key to coordinating and communicating problems, decisions, and progress to agency and contractor personnel.

(See related guidance items 18, 26, 27, 28, 29, 32, 33, 34, 48, 51, 53, 56, and 57.)

MAINTAINING ADEQUATE RECORDS OF AGREEMENTS AND DECISIONS

During each project phase alternatives and constraints will be considered and decisions and commitments made. Adequate records of these should be kept and circulated to assure effective communication and coordination.

(See related guidance items 2, 4, 13, 22, 35, and 58.)

EFFECTIVE PLANNING, TIMING, AND PHASING OF SYSTEM DEVELOPMENT

Most contractors considered inadequate agency planning a cause of many system development difficulties. Agencies should begin early to plan for system change or development and should plan continuously throughout the process. If too little time or personnel are devoted to planning, essential details and factors will be overlooked, leading to costly changes in the design and development phases, poor system performance, or delayed implementation.

A key planning consideration is timing the release of the RFP. Many agencies allow funding uncertainties to delay the RFP until just before the end of the fiscal year. If there is a flood of RFPs, contractors must limit the number of proposals to which they will respond, thereby reducing competition on a given RFP. Proposals prepared at this time may not be as technically responsive or innovative as at an earlier, less rushed time. If an agency's evaluation of contractor proposals is hurried because of the compressed schedule, selection criteria may be improperly or inadequately applied.

Proper phasing of system design is necessary for establishing control points at which the agency coordinator can evaluate the contractor's progress and approve initiation of subsequent phases. The phases usually consist of the conceptual, general, and detailed designs.

Implementing the system in segments offers additional agency control. As modules are developed, tested, and integrated, problems can more easily be identified and corrected. Both the contractor and the agency should be involved in implementation to insure that the system does what it was designed to do. A special effort should be made to insure that all changes during phased implementation are properly documented.

(See related guidance items 3, 6, 7, 14, 15, 16, 17, 54, 59, 60, 61, 62, 63, 64, 65, and 66.)

FAIR SELECTION OF A COMPETENT CONTRACTOR

In seeking contractor assistance, the agency is trying to obtain a system which meets its information requirements at the lowest cost in the least time.

The best method is competitive contracting, which enables the agency to obtain alternative system development approaches and cost estimates from qualified firms. Agencies must carefully develop, explain, publish, and apply criteria for selecting a contractor. It is especially important to assign a weight to each criterion.



Because of complexities and differences in alternate technical approaches, conducting competitive negotiations with firms which have been found highly qualified is generally the best approach. Agencies should base selection of contractors on a combination of proposed technical design, staff qualifications, and cost.

In deciding on the method of contracting—cost reimbursement or fixed price—the agency should consider the complexity and specificity of system requirements, division of risk between the agency and contractor, and the availability of funds. If the type of contract used and the systems development work required are not compatible, qualified contractors may not respond to the RFP. In addition, relationships between the agency and the successful contractor may be impaired.

(See related guidance items 23, 24, 25, 31, 36, 37, 39, 40, 41, 42, 44, 45, 46, and 47.)

MANAGEMENT INVOLVEMENT AT KEY POINTS

The final major lesson learned is the importance of early and continuous involvement of agency upper management. Management's commitment to a system change will set the tone for the development effort. If management is neutral or unenthusiastic, the system development project team will be too. Upper management must participate in determining user requirements, selecting and chartering the project coordinator, committing resources, selecting the contractor, and making contract decisions.

Periodically, management should plan reviews and briefings to provide project visibility, evaluate problems and progress, and make key decisions. Management must also make itself available to the project coordinator and principal contractor manager.

Developing successful systems requires close contractor-agency teamwork. Management should help maintain good relationships between agency and contractor personnel and thus insure the achievement of the system's objectives.

(See related guidance items 8, 9, 10, 19, 30, 38, 43, 49, 52, 67, and 68.)

CHAPTER 2

CASE STUDIES

Agencies and contractors presented many examples of both good and bad experiences in developing management information systems. We have chosen the three included in this chapter to illustrate the importance of following the guidance items presented in chapters 3 through 6.

CASE STUDY ONE

This case study demonstrates the problems that can be encountered, especially in the case of large systems, if good systems development procedures are *not* followed.

In 1965 a constituent agency authorized the development of three administrative information systems and a general-use data-base management system. Although the four systems have been under development for several years, none are operating. About \$7.7 million has been spent to develop the systems and acquire large-scale computers.

In 1965 the agency contracted for studies of design concepts necessary to develop a staff requirements and personnel information system. Then, in 1968, the agency decided to develop the system in-house on the basis of the contractor studies. However, the studies did not contain information necessary to justify the decision to proceed with the system development. For example, the studies did not include agency management's information needs, a description of how the system was to help accomplish the agency's programs, or a concise and complete statement of system specifications. (*Guidance item 1.*)

In 1969 the constituent agency decided to develop the general-use data-base management system—at an estimated cost exceeding \$700,000—without obtaining departmental approval, or evaluating the capabilities of other available systems. During the late 1960s, many commercially developed systems, as well as a system sponsored by other Government agencies, became available. (*Guidance items 5 and 8.*)

In 1971 the agency authorized development of another comprehensive information system—at an estimated cost of \$1.8 million—without identifying the requirements of operating managers, defining specific objectives of the system (user requirements), or considering such alternatives as streamlining and improving existing systems. (*Guidance items 1, 2, and 5.*)

In 1971 the agency authorized development of a logistics information system without an underlying study of need or a cost-benefit analysis. This project was halted after the agency had spent about \$118,000 on such efforts as determining what data should be included and training personnel in operating the system. (*Guidance items 5, 6, and 7.*)

In 1971 and 1972 the agency purchased and installed, at a cost of \$3.1 million, two large-scale computers and related peripheral equipment to support the systems discussed above. The agency did not critically analyze its data processing workload before buying the computers, consider any alternative to buying an additional backup computer, nor make sure the systems were ready for operation before installing the computers. As a result, when we visited the facilities the computers were operating at less than 8 percent of capacity.

In summary: The development cycle has been prolonged. Costly equipment has been acquired prematurely. A systems development project was unable to satisfy the user requirements. (*Guidance items 1, 7, and 17.*)

We believe the following factors were lacking:

An adequate user requirement study.
(*Guidance item 3.*)

A priority requirement statement.
(*Guidance item 4.*)

A final statement of requirements.
(*Guidance item 8.*)

A qualified, committed project manager.
(*Guidance items 11 and 12.*)

A cyclical, detailed planning process.
(*Guidance items 15 and 16.*)

CASE STUDY TWO

An agency had grown phenomenally in both the volume and complexity of its programs, many of which involve large loans. Loan balances were \$4 billion in 1968 and \$14 billion in 1975, and will approach \$24 to \$30 billion in 1977. Major legislation in 1972 changed the agency's emphasis from farm development to rural community development, including a community facilities loan program and a business-industrial loan program. These programs are conducted through a nationwide system of 1,750 county offices where services are easily accessible to people living on farms and in the rural community.

The new multiple-loan programs obviously have tremendously increased the data and information needed by the agency's local supervisors to manage the increased loan activity. However, the existing management systems in the agency were created on an incremental, patchwork basis, were unrelated, and did not provide management with the data required to manage the programs effectively and efficiently.

When the current administrator was appointed 2 years ago, he immediately recognized the problem and set out to create a new management information system. After 6 months of intense preparation, an RFP was released and given maximum publicity and distribution through the *Commerce Business Daily* and industry associations. (*Guidance item 31.*)

A preproposal conference was conducted shortly after the RFP was issued. All questions submitted before the conference were answered and replies were sent to all potential contractors. There were 136 requests for the RFP, but only 6 firms submitted offers. The succinct, clear selection and evaluation criteria included in the

RFP discouraged unqualified contractors from submitting a proposal. Thus, the cost of evaluation and negotiation for the system procurement was reduced. (*Guidance items 26, 30, 32, and 35.*)

Key agency and departmental officials from design, user, contract administration, and computer system groups attended the conference and answered prospective contractors' questions. Adequate discussion time was allowed. (*Guidance items 36, 38, and 39.*)

A key selection criterion was that the contractor had previously developed a system comparable in scope and complexity to that required in the RFP. In addition, the personnel who had developed the previous system were to be assigned to the current development. The evaluation team not only visited the potential contractors' offices to verify their statements but also visited the organizations for whom they had developed and implemented an operating system. In-depth discussions were held with those organizations to determine how well the contractor had performed during the system's design, development, and implementation stages and how well the current system was operating. (*Guidance items 37, 44, and 45.*)

The technical evaluation of the offers was conducted separately. The evaluation team ranked contractors in each evaluation area—technical design; firm and personnel qualifications; price (based on detailed cost analysis); and delivery schedules—and assigned total points to each offer. In the final negotiations with three offerors, sessions were conducted with individual firms, all information was kept confidential, and complete records were maintained to explain why unsuccessful firms were not selected. (*Guidance items 40, 41, 42, 43, 46, and 47.*)

In the procurement, the evaluation team closely adhered to the selection criteria in ranking proposals and selecting the firm. Records were kept on the entire evaluation process and the five unsuccessful offerors were fully briefed. The two unsuccessful finalist wrote letters complimenting the team on the fairness, thoroughness, and professionalism of the entire procurement process and particularly the evaluative and briefing processes. At the time of our study, the system was not yet operational, but indications were that it would

achieve the objectives of the system development. (*Guidance item 49.*)

CASE STUDY THREE

During 1972, an agency drastically changed its financial management operations by replacing its decentralized, manual, obligations-oriented, allotment-type accounting system with a totally centralized, automated, cost-based financial management system. The plans for the system provided for:

- A unified financial management information and control system which includes budgeting, accounting, and data processing activities.

- Integration of accounting functions, such as billings, collections, payments, payroll, general ledger, cost reporting, obligations reporting, and property records, into a single automated system.

- Complete financial data for developing and using cost-based operating budgets for internal planning and control.

- Financial data with a consistent basis for comparing the performance of similar organizational units and activities.

- Prompt, accurate internal and external financial reports.

The agency's administrative budget alone totals more than \$100 million, with approximately \$55 million appropriated and the remaining \$45 million collected for services.

Since most of the agency's funds involve more than one division, the financial management system had to provide for budget planning and control by organizational unit as well as by budget project, budget activity, and fund. The agency is responsible for 5 appropriated funds, including 6 operating activities and 43 projects, and 16 trust fund fee accounts. In addition to the administrative budget, the agency controls appropriated funds which total more than \$1.2 billion annually.

While the old accounting system generally met external reporting requirements, such as those of the department secretary, the Office of Management and Budget, and Treasury, it produced few internal reports suitable for use by top management in reviewing program operations and making financial decisions. Budgeting and accounting were unrelated. Decentralization caused problems in coordinating and controlling accounting records—reports were late and errors difficult to trace and correct.

Recognizing that this system was grossly inadequate to answer the increasing demands for prompt, accurate financial data, the agency decided to design a totally new system. During the fiscal year 1969, it contracted with a firm to develop, document, and install an accounting system that would meet its needs, as well as GAO standards.

After 2 years of effort by the contractor and agency employees, the new system was approved by GAO and began operating in 1972. The new unified financial management system provided for (1) complete cost data for cost-based operating budgets, (2) integration of related activities, and (3) extensive automation.

Two comparatively minor problems were encountered in implementing the system.

Incomplete training was provided; many people found themselves working with a system they did not fully understand. (*Guidance items 59 and 64.*)

Programming difficulties delayed the planned implementation because additional agency and contractor efforts were needed. (*Guidance items 65 and 66.*)

However, this system development was successful principally because:

Planning was started more than a year before a system development contract was signed. A well thought out plan of action was adopted. Management acceptance and backing of

the project were obtained early and a well-documented RFP was prepared. (*Guidance item 14.*)

The system development was directed by a full time project coordinator who reported to the agency's deputy administrator for management. (*Guidance item 12.*)

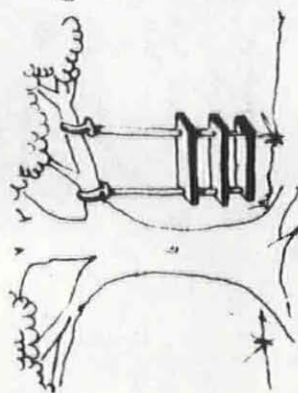
The contractor and agency personnel worked closely on a cooperative basis. (*Guidance item 52.*)

Both headquarters and field program offices were involved heavily during design phases. Monthly design reviews were held with key program staff. (*Guidance item 55.*)

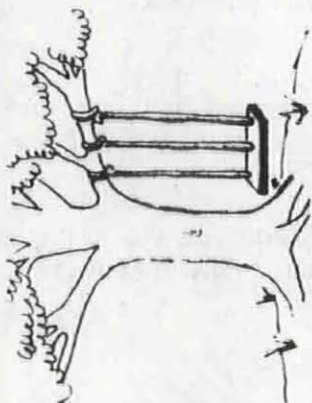
Numerous progress reports and drafts of reports to be produced by the system were prepared and sent to key administrative and program people for comments. (*Guidance items 55 and 56.*)

A detailed implementation plan including parallel testing was developed. The contractor participated fully in implementing it. (*Guidance items 60, 61, 62, and 63.*)

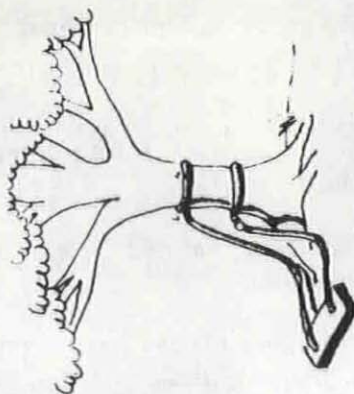
HAS THIS HAPPENED TO YOU



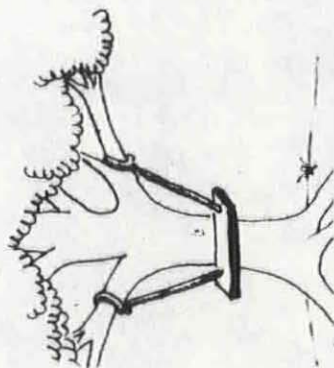
As requested by user



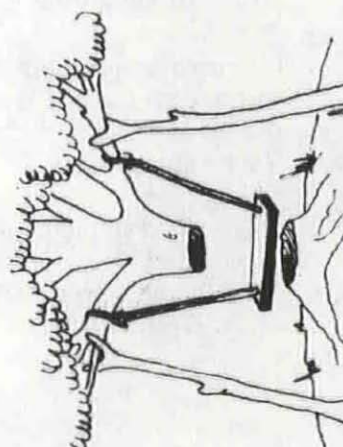
As proposed by project coordinator



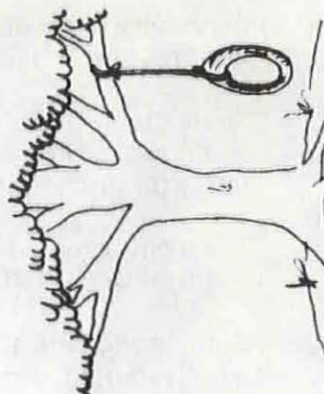
As specified in the request for proposal



As designed by contractor



As implemented at user site



What the user needed

CHAPTER 3

DEFINING THE PROBLEM AND PLANNING FOR SYSTEM CHANGE

DETERMINING USER REQUIREMENTS

Because information needs are constantly changing, agencies must develop or modify management information systems. The new requirements may arise from within the agency or elsewhere, such as from congressional actions or administrative reorganizations. As agencies establish and implement new internal procedures and programs, information processing and reporting requirements will usually increase.

When complex and extensive system changes are needed, the task of defining problems and identifying user requirements must be carefully considered early in the system development process. When user requirements are well established, the agency has a firm basis to consider alternate ways of developing a system to meet them.

1. **Determine user requirements as the first step in modifying or initiating a management information system.**

Agencies should encourage those functional groups primarily supported by the system to continuously recommend improvements. The user group is in the best position to recognize unsatisfied information requirements. Agency management may also suggest improvements.

For the agency to continuously update user needs, a central collection point should be established to record and categorize system problems and the requirements of users and management. This accumulated information should be continuously analyzed and evaluated to provide a basis for a prompt decision to change the system. Our study showed that systems have frequently been developed on a crash basis.

2. **Obtain user group agreement on all externally proposed changes.**

Recommended changes can originate from a variety of sources other than the user group, including agency management, the systems development group, internal and external auditors, and

unsolicited offerors. Because the user group will be the primary organization working with the new information system, it should review all externally proposed system capabilities and outputs.

As documented requirements and analyses accumulate, positions and justifications for and against certain changes will begin to form within the agency. At this point, the agency should begin a formal, coordinated effort to study, validate, and rank new information requirements.

3. Allow adequate leadtime to study requirements and to relate them to agency objectives and long range plans.

To insure effective involvement and coordination by all affected organizational elements, a task group should be formed to analyze information on problems and requirements in relation to agency objectives and long range plans. The task group leader should be the leading candidate for project coordinator. (*See guidance item 11.*) The task group members selected must have adequate technical ability and receive sufficient time to study, evaluate, and rank all user requirements.

Since few agencies possess unlimited budgets for creating and improving systems, the study and analysis should eventually concentrate on ranking the information the user activity must have and can afford. The study's objective—and management's responsibility throughout the procurement—is to distinguish between needs and wants, mandatory and desired capabilities, current and future requirements, and feasible versus unrealistic system performance.

4. Make the study's final product a statement of requirements in their order of priority.

Once the user group has reviewed and evaluated all proposed changes, the task group should develop a priority statement of user requirements which will give management a basis for carrying out the agency's program objectives and long range plans. This statement will give both the user group and management a basis for understanding the planned system performance.

5. Before considering design and implementation of a totally new system, examine feasible alternatives.

A completely new system may be unnecessary to satisfy user requirements. Possible alternate solutions which should be considered are to:

Use in-house personnel to modify the existing system.

Use the technical personnel of another agency or a contractor to redesign or rebuild the present system.

Adopt all or part of another agency's system.

Acquire and modify an existing, commercially available system.

In screening alternatives, the study group should consider:

The urgency of putting the new system into operation.

Computer programming problems which may be encountered.

The capabilities of existing equipment.

The cost of modification.

The types and availability of skills necessary to design, develop, and implement the alternatives.

6. Convert each system requirement into design tasks and identify the skills needed to complete each task.

Each requirement should be converted into a design or development task and the skill levels and number of people necessary to complete each task should be identified. Computer machine time may be necessary to complete some tasks. The types of personnel and staff time needed to complete all tasks will give the study group a basis for determining if the system can be developed internally.

7. **Identify the people available to design, develop, and implement a new system.**

The resources inventory should identify all agency personnel who have the required design skills and can be made available for the system development project. By comparing available agency personnel skills with those necessary to develop the system, the agency can better evaluate alternate development solutions and, if it decides a contractor is necessary, can better describe what skills a potential contractor should provide.

8. **Do not consider contracting for the system design until upper management has approved the statement of requirements and design approach.**

Agency upper management must review and approve the requirements statement and the study group's proposed system development project. Upper management should require a presentation by the study group on the statement and the proposed design approach along with justifications and rationale. If upper management is dissatisfied with the study, it might obtain advice from executive agencies or organizations which have developed similar systems or those agencies which have been involved in systems development such as the Joint Financial Management Improvement Program, the Office of Management and Budget, the General Services Administration, and GAO. Management might also consider contracting with qualified individuals or a professional services firm to help review the requirement statement and the proposed system development approach.

IN-HOUSE DEVELOPMENT VERSUS CONTRACTING

Once the agency has defined and evaluated its user requirements, it must decide whether to commit in-house personnel to develop and implement the new system or contract for development.

9. **If the decision is made to internally develop a new information system, management should make as few changes as possible in personnel committed to system development.**

The GAO study showed that agency personnel assigned to system development projects are changed too frequently. To assure that effective and continuous effort is applied to attain a reliable system, agency management should minimize changes in the agency system development team.

10. If the decision is made to contract, capable agency personnel should be assigned to assist the system development.

Capable agency personnel should work full time to monitor and aid the contractor in designing and implementing the system. These personnel should be able to understand complex system needs, guide the contractor's performance, and report on problems and progress.

PROJECT COORDINATOR SELECTION AND FUNCTIONS

Whether in-house or contractor development is chosen, an agency project coordinator is needed to integrate and direct the development team and to monitor its performance. Our study showed that those development efforts which had no qualified project coordinator had more difficulty achieving successful systems.

11. Select the project coordinator as the first step after deciding to hire a contractor.

The project coordinator is an important catalytic agent in system development and implementation and should be selected at the earliest possible moment in the development process, especially when contractor assistance is anticipated. The project coordinator should participate in the user requirements study and the development of the requirements statement. (The coordinator may have been the task group leader for the requirement study.)

In the early planning stages, the project coordinator or task group leader brings together the agency's personnel, including the user group, to concisely define user requirements and plan for system design, development, and implementation.

12. **Select a well-qualified agency official as the project coordinator and give him or her adequate resources.**

The project coordinator generally should be selected from the prime functional area that the proposed system will support. Important requisites for a project coordinator are the abilities to (1) plan, direct, and control resources, (2) communicate and cooperate with management and others involved in the development work, and (3) make necessary decisions to insure the success of the project.

The project coordinator should be given (1) the authority to cross functional lines to communicate and coordinate the project and (2) direct access to key agency managers. The coordinator can get advice from a technical evaluation panel (to evaluate proposals) and a technical review panel (to review the contractor's design performance). (*Guidance items 3, 38, and 55.*)

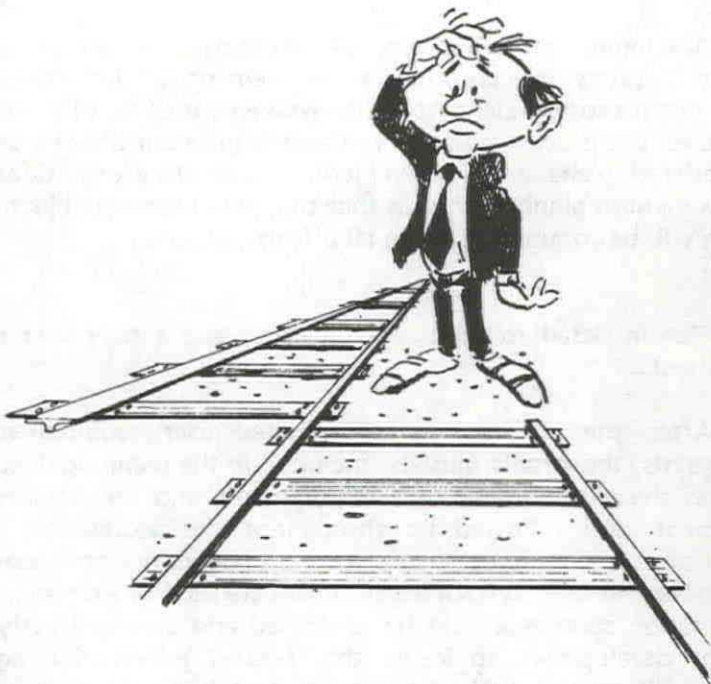
A project coordinator's job should be a full-time assignment until the system is operating satisfactorily; too often agencies assign a project coordinator part time.

In large system development projects, the agency may want to designate a deputy project coordinator to assure continuity of project management.

13. **Document the project coordinator's authorities and responsibilities.**

At an early stage, the project coordinator's authorities and responsibilities should be stated, including (1) the limits of his or her decisionmaking authority over system development and (2) who has the authority not delegated to him or her. A statement of the project coordinator's responsibilities will strengthen his relationship with both agency and contractor personnel and will help avoid indecisive contract management and delays in system development.

PLANNING THE SYSTEM'S SCOPE



Most of our guidance items pertain to specific steps in the development process and are in rough chronological order. However, agency officials and contractors emphasized several points bearing on the whole planning process. These are presented as guidance items 14 to 17.

14. Plan early to provide maximum communication and coordination among key personnel and groups.

In the planning process, the agency should organize its system objectives and long range goals and quantify risks, costs, and benefits for detailed evaluation and control of the system development. Planning should begin early for the specific steps required to accomplish the system's objectives, identify needed resources, and develop schedules for completion. Plans should provide for adequate management control over the development, including periodic reviews at key decision points and reviews of the adequacy of project staff.

15. Continuously involve all affected groups in the planning process.

Developing effective user requirements for an information system requires the continuous involvement of individuals from many organizational elements. The involvement cannot be a one-time exposure; the process must permit and require continuous exposure to updated plans and involvement in key decisions. Continuous involvement in planning insures that changes in system objectives and design will be communicated to all affected groups.

16. Plan in detail to adequately identify and satisfy user requirements.

After the agency has coordinated user requirements and constraints, the details must be included in the planning documents, such as the statement of user requirements and the detailed work statement, and followed up throughout the acquisition. Careful attention to planning details can prevent spending unnecessary time and money in later system development stages. For example, needed information sources should be identified and arranged early in the system development to insure that needed information and data inputs will be supplied when the system becomes operational. If major changes are made in the system design without corresponding changes in information sources, system operation may be delayed. Training is another example of a planning detail which frequently has not been changed to match changes in the system design.

17. Direct the planning toward an organized set of detailed system requirements.

The work statement is the prime product of the early planning process and includes the detailed requirement statement, the processing requirements, cost-benefit expectations, all system constraints and the tasks to be performed. Once the work statement is completed, the user activity can obtain final management commitment and approval. The agency can then proceed to select the contractor.

CHAPTER 4

PREPARING THE WORK STATEMENT AND SOLICITING CONTRACTORS

Successful contractor solicitation to a large extent depends on the effectiveness of planning before solicitation. A detailed work statement, a key product of that planning, should be developed and approved before either internal or contracted systems development.

During solicitation, the project coordinator should work closely with the agency's contracting officer to insure compliance with procurement regulations. The contracting officer is the agency's formal representative in procurement actions, such as the formal solicitation of proposals. The contracting officer should establish controls to assure that proper justifications and documentations are prepared and maintained, appropriate approvals are obtained, and funds are correctly obligated and disbursed. Before issuance, the contracting officer should review the RFP to be sure it effectively communicates the system requirements and the related tasks to be performed by the contractor.



COOPERATION AND COMMUNICATION

18. Arrange a meeting of the project coordinator and contracting officer as soon as possible after deciding to contract.

These officials should discuss the ground rules and approach to the procurement, the need for a preproposal conference, and all other matters requiring their mutual agreement and coordination. Early and continuous contact between the project coordinator and the contracting officer will avoid later problems.

19. Confirm the continued commitment of agency officials to the proposed system before preparing the detailed work statement.

Informal agreements and commitments may have been made during the user requirements study (*Guidance item 3*). Many changes may have subsequently been made in the system requirements which changed the impact on different groups within the agency.

The project coordinator, therefore, should obtain a full, formal commitment to the system development before preparing the work statement which will be included in the RFP. Obtaining recommitment by agency officials to the project at the beginning of the solicitation stage can help insure that (1) the project coordinator will receive all resources needed, (2) all agency organizations are fully informed of the system development plans, and (3) full support will be given to the project.

DETAILED WORK STATEMENT

The detailed work statement is the most important document in the system development project, especially one to be completed with contractor assistance as opposed to an internally developed system. The work statement serves as the agency's basic control over the contractor's performance since it specifies the tasks to be done.

20. Set, as a primary work statement objective, understanding of the planned system, its processes, and products.

The detailed work statement is included in the RFP provided the potential contractors. However, the work statement does more than just tell the contractor what the agency requires; it also serves as a basis upon which to evaluate proposals. If it is specific, the work statement will narrow the cost range of offers and content of proposals. One agency issued an RFP and work statement so vague that proposed prices ranged from \$200,000 to \$2.8 million, a range of 1,400 percent.

Agencies should prepare the work statement well enough to minimize subsequent changes. If the agency does not prepare a good work statement, subsequent changes may, in turn, require costly design and reprogramming changes and may cause delays in system implementation. If the detailed work statement is vague, misinterpretations and possible contract disputes on the grounds of changes in contract scope may arise.

21. Identify end-product requirements clearly and completely.

Although the agency should avoid specifying a detailed system design, it must very specifically define what the system must accomplish.

Although the requirements will differ in each system, the work statement should include:

Reports to be generated.

Data base to be maintained.

Input and processing.

Programs to be developed.

Hardware available or to be acquired.

Each requirement should be described as a specific task which the contractor will fulfill.

22. Adequately identify and document all agency resource commitments and constraints.

Important items frequently left out or vaguely stated in the work statements are agency resource commitments made to the contractor and constraints on system design. If any of this information is omitted or subject to later interpretation, disputes may arise requiring senior agency and contractor management attention.

To assure satisfactory proposals and avoid disputes during contract performance, the RFP should spell out the services and resources which will be provided by the agency, such as:

Personnel (number and qualifications).

Work space.

Computer time.

New form preparation.

Training.

The RFP should also spell out the constraints which will be placed on the contractor and the system, such as limitations on changes in organizations affected by the system and time to complete integral phases of the system development. More responsive proposals and fewer administrative disputes will result if the work statement includes information of this type.

REQUEST FOR PROPOSALS

Because the RFP is the contractors' basis for preparing proposals, it must include all pertinent data. In addition to the work statement, the RFP must include:

Type of contract (fixed price or cost reimbursement).

Contractor selection criteria.

Contractor administrative requirements.

Acceptance test plan.

Implementation plan.

Glossary of terms.

System documentation requirements and standards.

23. Choose the procurement approach and type of contract which will help achieve the final objective—an efficient, effective system.

A poor choice of procurement approach can hinder system development because of disputes and misunderstandings. In the long run, problems arising from contract type can discourage good firms from submitting proposals. The contract type should facilitate the acquisition of the system, not hinder it.

Competitive negotiated procurement is, in many cases, the more advantageous approach in obtaining what is needed at the lowest cost. Competitive negotiation is initiated by an RFP, which contains both the agency's requirements and the criteria for evaluating offers. An RFP contemplates the submission of timely responsive proposals by a maximum number of responsible offerors, and is usually followed by discussion with those offerors who are in the "competitive range." The contract is awarded to the one whose offer is the most advantageous to the Government, price and other factors considered.

Competitive negotiation is similar to formal advertising in that (1) the goal is to achieve as much competition as possible and (2) the specifications must be as precise and meaningful as possible. It is different from formal advertising in that it permits evaluation on the basis of a combination of factors including price and allows discussion and clarification of ambiguities, misunderstandings, and mistakes during the selection process. Further, in competitive negotiations agencies may use any allowable contract type, and the system design specifications need not be as precise at the time of solicitation as are those required in formal advertising.

24. Use sole-source procurement as a last resort.

An agency should only use sole source procurement when it has been unable to find more than one qualified contractor who is willing to undertake the job. In the field of financial and other management systems design, such a circumstance should be extremely rare. In this field, there are many firms that have the necessary expertise. Some firms may be able to supply more efficient methods of achieving the end product, but only competition can expose the differences in approach and cost.

25. Carefully consider the type of contract.

The type of contract depends upon the circumstances of each individual procurement. The agency must consider the

innovativeness of system design,
complexity of the procurement,
degree of RFP specificity,
allocation of risk between the Government and the contractor,
degree of Government control, and
delivery schedule.

There is no general rule to use when deciding on the type of contract.

The cost-reimbursement and fixed-price contracts have advantages and disadvantages in individual cases. The fixed-price contract places maximum risk on the contractor. The contractor has a maximum profit incentive to control costs and perform the contract effectively. The fixed-price contract is suitable for procurements when reasonably specific design specifications are available and whenever fair and reasonable prices can be established before procurement. The fixed-price contract is particularly suitable in purchasing standard or modified systems for which sound cost estimates can be developed.

The cost-reimbursement type of contract provides for allowable costs incurred in the performance of the contract to be paid to the contractor. This type of contract establishes an estimate of total cost for the purpose of obligating funds and establishing a ceiling which the contractor may not exceed without prior approval of the contracting officer. Cost-reimbursement contracts place less financial risk on the contractor and more risk on the Government than do fixed-price contracts. The cost-reimbursement type contract is suitable when the cost of performance cannot be reasonably estimated.

If performance specifications cannot be detailed or if the agency wishes to participate with the contractor in evaluating trade-offs among alternative performance specifications which will have varying impacts on project costs and scheduled completion, a cost-reimbursement contract may be the best vehicle.

26. Develop contractor selection criteria when selecting the contracting method and include the criteria in the RFP.

Three areas in which basic criteria must be established in procuring systems are price, technical design, and technical qualifications. Competition in terms of technical qualifications is more appropriate for complicated systems because success depends on technical ability of contractor staff. But high quality may mean high price. Therefore, a possible compromise is to evaluate proposals on the basis of a combination of price, design, and technical qualification criteria.

The RFP must state the selection criteria the project coordinator will be using. Since competitive negotiation calls for as much competition as possible, the RFP must clearly specify what the evaluation factors are and identify their relative importance. In this regard the Comptroller General has stated:

"Intelligent competition requires, as a matter of sound procurement policy, that offerors be advised of the evaluation factors to be used and the relative importance of those factors. Each offeror has a right to know whether the procurement is intended to achieve a minimum standard at the lowest cost or whether cost is secondary to quality. Competition is hardly served if offerors are not given any idea of the relative values of technical excellence and price."

27. Include in the RFP all contractor administrative reporting requirements.

The RFP should include all reporting requirements so contractors can understand the controls to be exercised by the agency, and be more responsive to the RFP.

Adequate performance reporting is required to insure good communication and control. The reporting requirements should be supplemented by informal communication to resolve any problems which may arise between reporting intervals. The lack of reporting requirements may result in inadequate project control.

The following information is the minimum necessary to manage the contract.

Actual versus scheduled progress.

Incurred versus estimated cost.

Problem areas to be resolved by the contractor.

Problems needing resolution by project coordinator and their effect on the performance schedule.

Problems identified in prior reports which have not yet been solved.

Work to be done during the next reporting period.

The contractor must supply the information, and the project coordinator must critically evaluate and follow up on matters requiring his attention. Through the reports the project coordinator can analyze the contractor's progress, cost, and problem areas. Progress reporting should be as frequent as necessary and be complemented by continuous communication between the coordinator and contractor.

28. Include the acceptance test and implementation schedules in the RFP.

The project coordinator should prepare plans for testing and implementing the system before issuing the RFP. Both testing and implementation will require contractor resources; therefore, the plans must be included in the RFP to assure that contractors consider these requirements in preparing their proposals.

29. Include a glossary in the RFP to insure that system and performance requirements are understood.

A glossary gives the contractor and the project coordinator a common basis for communication and coordination. It should help achieve responsive proposals and effective progress reports after the contract has been awarded.

30. Review the RFP for clarity, comprehensiveness, and legality before distributing it.

Before distributing the RFP, the contracting officer should request a review by the (1) project coordinator and user group for technical accuracy, (2) general counsel for legality, (3) financial officer for availability of funds, and (4) upper management for final approval.

RFP DISTRIBUTION

31. Give the RFP maximum publicity and distribution.

To assure a good response to the RFP, arrangements need to be made to publicize the system procurement and provide effective distribution of the RFP. This is usually done by the contracting officer.

To give contractors not on a contractor list a chance to compete, the agency should place a notice of solicitation in the *Commerce Business Daily*. The notice should be placed in time to give prospective contractors adequate opportunity to request and receive a copy of the RFP, to attend the preproposal conference, and to submit a proposal by the due date.

Recent studies have shown that most RFPs for system design and development are issued in the last 2 months of the fiscal year. Contractors see this last-minute distribution as one of the biggest problems in agencies' procurement of systems and one which adversely affects contractors as well as the agencies. If agencies want maximum competition and responsiveness from highly qualified firms, the solicitation, evaluation, negotiation, and contractor selection process should begin early in the fiscal year to avoid an end-of-the-year rush.

PHASED COMPETITIVE NEGOTIATION

Negotiated contracts are usually preceded by a single RFP which describes the agency's requirement for a system and requests a formal proposal. The agency then evaluates the proposals, establishes a competitive range, and negotiates with the firms having the best proposals.

An alternative is the phased solicitation process. The agency first sends out and publishes in the *Commerce Business Daily* a notice of intent to procure a system. This notice gives an overview of the agency's system needs and requests a statement of the firm's capability to meet its needs, including a list of personnel to be assigned to the project, past experience related to the proposed project, and a general approach to the development of the system required.

The selection criteria discussed in Guidance Item 26 are crucial in using the phased process. The agency must present clear, detailed selection factors as an aid to contractors deciding whether or not to express an interest. Even though the notice of intent to procure is a synopsis of the RFP and is intended to generate as much competition as possible, neither the agency nor obviously non-competitive firms are well served if the selection criteria are so vague that a large number of those firms decide to respond anyway.

The agency reviews the material submitted and sends the RFP with the detailed work statement to firms selected on the basis of evaluation criteria included in the notice.

The agency should consider using the phased negotiated process if the system is highly complex. The phased process permits the agency to consider proposals from the more competitive firms and gives those firms a better opportunity to fully study the problem. This lowers the costs of evaluation and may result in (1) better communication between the agency and firms and (2) proposals that are more responsive to agency requirements.

The phased process lowers the firms' risk of preparing costly, noncompetitive proposals and may encourage better competition. The process is appropriate when proven design capability of the firm's staffs and an extended opportunity for the final offerors to interact with operating personnel are considered necessary to develop the best system design. Firms which decide not to compete benefit from the phased process because less time and money are spent on detailed proposals.

PHASE ONE

In reviewing a contractor's competitiveness, the agency should consider three primary areas; capability, experience, and general approach to systems development. The contractor's capability should be reviewed in light of the backgrounds of the management staff to be assigned; ability to finance the contract; organization; methods of operation; special expertise, including automatic data processing capability; and past experience with projects of similar magnitude or complexity.

The contractor's experience should be reviewed in light of the number and types of clients presently serviced; types of services rendered to clients; and past experience with Federal, State, and local governments. A special effort should be made to determine the effectiveness of the contractor's staff performance on similar system development projects.

The contractor's general approach to systems development should be evaluated in terms of (1) the quality and quantity of personnel to be assigned to each task, (2) staff organization, (3) plans for working with Government personnel, (4) planned controls over time and expenditures, (5) planned techniques to perform the work, and (6) evidence of ability to document systems procedures and develop useful reports.

The award criteria should be detailed in the notice of intent to procure, and the value assigned to each item should be listed. The evaluation team should use the established criteria to select firms qualified to participate in the second phase.

PHASE TWO

The project coordinator and the manager of the user organization, using the established criteria, should select offerors and encourage them to submit fully developed technical proposals with required cost information. This selection process should not be used for administrative expedience but to encourage firms with the requisite capability to submit proposals.

The second phase is like the normal competitive negotiation except that the RFP is sent selectively to those firms judged most competitive. Firms not requested to participate in phase two which desire to compete may still request and receive a detailed RFP and submit a proposal.

CHAPTER 5

PROPOSAL, EVALUATION, NEGOTIATION, AND AWARD **PREPROPOSAL CONFERENCE**

32. Conduct a preproposal conference shortly after issuing RFP.

The contracting officer and the project coordinator are often called upon to answer offerors' individual inquiries or to provide information. Information of a substantial nature given to one firm must be given to all firms. The contracting officer must determine whether the information requested will give one firm an advantage over others and subject the agency to accusations of favoritism. Unsuccessful contractors have based bid protests on such accusations.

The preproposal conference is a meeting to which all potential offerors should be invited (date, time, and place should be indicated in the RFP) to provide general reactions to the RFP and to promote uniform interpretation of all statements and specific requirements contained in it. The conference gives all potential offerors an opportunity to clear up questions about the proposed project. Questions may be written to the project coordinator before the conference or asked orally or in writing during the conference.

33. Have key agency officials involved in the system project attend the conference and answer questions.

The contracting officer should conduct the conference and the project coordinator should answer technical questions on the desired system. In preparing for the conference, the contracting officer and project coordinator must coordinate with all other agency officials—designers, users, contract administrators—involved in the system project. Written questions involving technical matters submitted to the project coordinator or the contracting officer should be researched by technical personnel to insure that appropriate answers are supplied.

34. Include major concerns or issues in the conference agenda and allow adequate discussion time.

To insure an orderly and productive conference, an agenda should be developed and given to all attending:

During the conference, the agency should:

Explain the background and need for the system, including performance target dates.

Describe similar current and past efforts.

Clarify all RFP statements and specifications.

Resolve all contractor questions, even if agency research is required.

Clearly explain the criteria methods for selecting the contractor.

Outline the award schedule.

Stress agency commitment and full support.

35. Document the conference proceedings and distribute the record to all potential offerors.

Have a stenographer present to record essential questions, answers, and issues discussed at the meeting, which should then be summarized and provided to all potential offerors.

EVALUATION

The objective of proposal evaluation is to select all competitive proposals. A proposal is competitive unless it is so technically inferior or costly that meaningful negotiations are precluded. The contracting officer is responsible for deciding whether a proposal is in the competitive range.

36. Arrange for several knowledgeable members of the user organization to be available to answer the final offerors' questions.

The project coordinator must insure that all questions arising from the detailed RFP are answered fully and accurately while the contractors are preparing their proposals. If necessary, knowledgeable members of the user organization should respond to offerors' questions.

37. Visit the office of each offeror.

The project coordinator and the contracting officer should visit each offeror's office to determine the adequacy of facilities, personnel, and automatic data processing support. In relatively small efforts, this step may be too costly and unnecessary. In other more complex efforts, where personnel, facilities, and automatic data processing support are key elements, site visits may be of great importance.

38. Carefully select an evaluation team.

The evaluation team should include the contracting officer, the project coordinator, the user organization manager, a panel of technical experts, and a representative from the legal staff. The overriding concern should be the objectivity of team members. If the procurement is especially important, upper management may wish to participate with the project coordinator and the contracting officer in selecting the evaluation team.

39. Review each proposal as soon as it comes in.

The contracting officer and the project coordinator should determine that each offer is complete and satisfies the RFP requirements and any subsequent amendments. If any incomplete offers are submitted before the final proposal cutoff date, the project coordinator should advise the offerors of the missing elements. After the evaluation team has been selected and the project coordinator and contracting officer have briefly reviewed each offer, the team should begin detailed analysis.

40. Give the panel of agency technical experts responsibility for evaluating each proposal on its technical merits.

The first step in the detailed evaluation process is an analysis of each proposal's technical merit by the panel of technical experts. Once the panel determines that the proposals are technically acceptable, the entire evaluation team should review each proposal in its entirety.

41. Make the evaluation team responsible for in-depth review of each offeror's qualifications, price quotations, overall design concept, delivery schedule, and administrative procedures.

As the evaluation process continues, the team should rank each major element of the proposals according to preestablished criteria and determine composite rankings. The ranking will form the basis for establishing the competitive range and initiating negotiations with those firms in the competitive range.

42. Conduct a cost analysis of each proposal.

The RFP should require the offerors to break down and justify their estimated costs and identify the cost. The cost analysis, i.e., verifying the cost and the estimates' reasonableness should be performed by agency audit and technical personnel at the offerors' plants or offices.

43. To avoid future litigation, adhere to the selection criteria in the RFP, document the evaluation process, and prepare to brief all unsuccessful offerors who so request.

Deviating from the stated selection criteria, failing to document the entire evaluation process, and failing to explain to unsuccessful firms the reasons for their nonselection may result in bid protests.

NEGOTIATION

Once all proposals have been evaluated, the evaluation team should have identified offerors whose proposals merit negotiations. Before beginning formal negotiations, the following two preliminary steps should be taken.

44. Organize a negotiation team headed by the contracting officer.

The contracting officer should be given the primary responsibility for selecting the negotiation team members. The team should include the project coordinator, one or more representatives from

the user organization, technical advisors, and financial analysts. The contracting officer is responsible for establishing procedures, an agenda, and a timetable for the negotiations. The contracting officer should also establish the negotiation team's positions on selection considerations, priorities, and goals.

If not technically qualified, the contracting officer should delegate technical negotiation to a team member.

45. Obtain basic negotiating data from each final offeror.

Examples of data which should be obtained are:

Department(s) within each firm where the contract work will be done.

Names and functions of personnel who will be working on the project.

The purpose of these preliminary steps (sometimes called the prenegotiation process) is to confirm that the key personnel included in the proposals negotiate and if selected, perform the work.

46. Conduct individual negotiating sessions with each offeror.

During each individual session, the contracting officer should attempt to resolve all major issues to the satisfaction of the agency as well as the contractor. When negotiations have been completed with each offeror in the competitive range and at least one of the sessions has resulted in an acceptable agreement, the contracting officer should announce an official cutoff date for a "best and final" offer from each offeror. The offers should include any combined adjustments of price, personnel, and technical aspects to make proposals more competitive.

If a cost type contract is to be awarded, care should be exercised that the offerors' final offers are realistic cost estimates and do not represent an attempt to "buy-in" without risk, since payment will be based on actual cost.

- 47. Insure that all information obtained during negotiations is kept confidential.**

The offerors have proprietary interest in their proposals, and therefore the evaluation team must safeguard the confidentiality of the proposal information at all times.

AWARD

The final award is the contracting officer's responsibility. He should carefully consider the negotiating team's findings and recommendations, the agreements reached during negotiations and all proposal changes. In major management information systems acquisitions there may be a source selection board that reviews the results of evaluation and negotiation. There may also be a source selection authority, sometimes the head of the agency, who reviews the recommendations of the source selection board and makes the final award decision.

- 48. Before the contract is awarded, submit it to the project coordinator, user group manager, and legal staff for review.**

As a last step before contract award, the contract must be reviewed to insure that the agreements reached are acceptable to the project coordinator and will not present legal difficulties later.

- 49. Promptly brief unsuccessful finalists as requested.**

To lower the probability of bid protests, agencies, when requested by unsuccessful offerors, should brief them on the reasons for nonselection. An important second objective of these briefings is to promote more responsive proposals on subsequent development efforts.

CHAPTER 6

SYSTEM CONTRACT PERFORMANCE

This chapter covers the agency's working relationship with the selected contractor during contract performance.

It is important that an agency-contractor team establish rapport early so that both parties are working to achieve the contract's objectives.

The guidance included in this chapter applies to systems developed internally or with contractor assistance. If the system is internally developed, "Agency systems group" can be substituted for "contractor" in the guidance items.

QUICKLY RESOLVE QUESTIONS AND ISSUES

After the contract has been awarded and the contractor begins to work with the agency, questions and issues will begin to arise over definitions, interpretations, and responsibilities. Questions may originate about the user requirements, responsibility for carrying out certain tasks, and proper working relationships.

50. Resolve any remaining problems which arose during previous stages.

Before the contractor begins working, the coordinator should resolve any outstanding problems. Effective coordination and communication are especially important during contractor performance. Communication among the coordinator, the contracting officer, the contractor, the user activity, and agency functional areas should be open and frequent.

51. Conduct an agency postaward conference.

The project coordinator and contracting officer should conduct the conference to discuss matters requiring clarification or resolution, contractual requirements, and areas of responsibility and authority, to insure that they are understood by all participants. The conference provides an opportunity for each participant to ask any questions regarding his/her role. The contracting officer, the project coordinator, system users, and automatic data processing or other special functional personnel should participate in the conference.

52. Conduct a postaward conference with the contractor.

The purpose of this conference is to develop an effective working relationship among the contractor, project coordinator, contracting officer, and user personnel. The conference will insure mutual understanding of the contract requirements and identify the authorities and responsibilities of the individuals representing the Government. The agency should also answer contractor questions and clarify administrative matters.

SYSTEM DESIGN

The approach to the system design can affect how well the system meets the user's requirements and the cost or time required to test and implement the system.

53. During the contracting process, determine the system design approach.

The design approach provides the framework for controlling the contractor's design, and therefore, should be part of the contract. The agency should have obtained the best design approach by using the evaluation criteria and contractor negotiations. When a design approach provides adequate review and control by the agency, the chances of receiving a system which satisfies the user's requirements are improved.

The two most common system design approaches are phased design and total design. The latter method gives the least control over the contractor's design, because the agency does not review the design until the contractor develops the complete system and submits it for approval. Since this approach does not permit periodic agency review during the design and development processes, the contractor may develop a system which does not satisfy the agency's requirements.

The phased design approach, on the other hand, gives the project coordinator an opportunity to effectively monitor the contractor's design development. This approach normally consists of

three major phases—the conceptual design, the general design, and the detailed design. At a minimum, the contractor's design should be submitted for agency review and approval at the end of each phase. If the system development effort is large and complex, the contract could require agency review during and after major tasks within each phase.

The contract should specify what the contractor is to present for what type of review. At each review point the project coordinator and the technical review team can evaluate the contractor's design, including the input and output, the availability of source data, and adherence to system constraints specified in the contract.

54. Use the phased design approach whenever possible.

By contracting for the phased design approach, the agency gets the opportunity to either (1) negotiate with the contractor on subsequent phases or (2) solicit competitive offers and negotiate each successive phase of the system development.

The agency may have chosen a cost reimbursement arrangement for the conceptual and general design phases, in order to permit participation with the contractor in deciding which system design alternative will best satisfy the agency's need. After the general design has been developed and the financial risk and contracting uncertainties are reduced, a fixed-price contract for detailed design and implementation may be negotiated. Using this approach in the later phases, the agency will have greater control over costs and implementation schedules, and the contractor will have more specific system specifications upon which to base staff, time, and cost estimates. If the phased design approach is used, the project coordinator must not only allocate enough time to insure a thorough review of the contractor's design but also establish review completion dates to prevent system delays.

55. Require other functional and user group personnel to review the design for acceptability.

The project coordinator, the contracting officer, key representatives of the user group, and each affected functional area should be

given the opportunity to review and evaluate all design segments, to insure that the design is practicable from all standpoints.

- 56. Require the contractor to state new input requirements when identified.**

If new data input requirements are not identified, documented, and evaluated early, development may be delayed substantially by the need to revise the system to provide for accumulating the new data. New data inputs usually require that new forms be designed, approved, and printed, ultimately necessitating additional staff.

- 57. During the general design phase, have the agency's internal audit group evaluate the contractor's design for adequate audit trails and internal controls.**

Providing appropriate audit trails and internal controls in the initial design of the system will minimize changes required after the general design has been completed. Late design changes inevitably delay system development and increase cost.

- 58. Once each phase has been approved, insure that the contractor and agency employ strict management to control change.**

Changes to the system's design can delay implementation, disrupt user activity, and raise costs. Proposed changes should be evaluated and if they are not critical to system operation, the project coordinator should consider deferring them until the system is operational. In any case the changes should be fully documented.

- 59. Plan and coordinate required changes as early as possible.**

During the general and detailed design phases, the agency and the contractor will usually identify additional changes needed in (1) organization of the user group or other agency component, (2) staff levels, and (3) computer and other resources. The project coordinator should effect these changes quickly to insure expedient implementation and operation of the system.

IMPLEMENTATION

The project coordinator should develop ways to promptly identify and solve problems to prevent delays in system implementation and operation.

As discussed earlier, the phased design approach provides maximum control and feedback to the contractor. Just as the design approach is important in controlling the contractor's design development and meeting the user's requirements, an effective implementation approach can minimize system problems.

60. Consider implementing the system in modules.

The two primary approaches to implementing the system are the complete system approach and the modular system approach. In the complete approach, the entire system is implemented and tested at the same time. If problems arise in any segment of the system, other segments generally will be affected. Problems are thus magnified. With this approach, segments of the system cannot become operational before the entire system is implemented.

Under modular implementation, the system is designed and developed in small segments, called modules, which will operate independently. As each module is developed, it can be tested separately and then in combination with others. After the module has been satisfactorily tested and approved, it can be implemented.

The modular approach helps to identify problem areas in the various subsystems and eases correction. In cases where specific system segments are urgently needed, modular implementation is especially effective. When using the modular approach, the agency must have a master plan for developing and integrating system modules.



61. Get contractors responsible for developing the design involved in implementing the system.

Agencies should not contract for systems development and then rely solely on internal expertise for implementation. The contractor designing the system has developed a knowledge base which is indispensable during implementation. The contractor can provide invaluable help in identifying problems and in "debugging" the system during implementation.

62. Test the system modules and/or the total system completely before implementation.

The objectives and scope of testing may vary considerably, depending on the type of software, the operational environment, needed reliability, and other factors. The agency should insure that the contractor intends to thoroughly test the software, even if the agency is planning to accept the system solely on the results of acceptance testing. Insisting on successful completion of early, less formal testing increases the chances that the software will perform satisfactorily.

The types of testing can generally be defined as:

1. Debugging, when the programmer is attempting to create an error-free program.
2. Development testing, when the programmer is testing small segments of the software (e.g., at the routine level).

3. Integration testing, when segments are joined to form modules.
4. Acceptance testing for each subsystem and for the total system.
5. Operational demonstrations.

Testing is generally a building-block affair. Each successive type of testing examines larger segments of integrated software, accomplishes different objectives, and is conducted with increasing formality.

Test objectives can be tailored to fit the modular development approach and can even be modified at almost any level of testing to address the system specifications of performance, accuracy, user flexibility, and other characteristics. If an error is found and corrected, retesting is necessary to demonstrate that previously accepted segments will not be affected by the change.

63. Test the new system concurrently with the old one (if any) until it satisfies the design requirements.

The implementation and acceptance test plan should provide for parallel system operation (old and new system functioning simultaneously). This is especially important if the user activity must have reliable information for operations and reporting. The system should not be converted until all tests have been completed and data outputs analyzed to insure proper system operation. If concurrent or parallel operation is not practical, the system should be debugged and fully tested before system conversion.

OPERATION

System conversion or implementation is a key step in acquiring a new system. If the system does not operate satisfactorily, the causes can usually be traced to deficiencies in the previous phases of system acquisition—planning, contracting, designing, developing, and implementing.

64. Finish arrangements for operating the new system, acquire the necessary resources, and train personnel before the system begins operating.

Any organizational changes required by the new system should have been developed, coordinated, and initiated before system implementation. If any of the arrangements have not been completed, the agency may have serious problems operating the system.

65. If required personnel are untrained, arrange for the contractor to operate the system and train the personnel.

Our study showed that inadequate training of agency system operators and users frequently caused system operational problems and delays even when a system was successfully designed and developed. Detailed training plans were often made early but were not modified to meet system design or implementation schedule changes.

66. Provide for contractor assistance after the system has been accepted.

System operation problems which require contractor help may arise after system acceptance and implementation. Therefore, the agency should consider providing in the contract for continuing assistance to be billed on an hourly basis. Such a provision would reduce the time required to make necessary corrections or modifications.

AFTER OPERATION AND CLOSEOUT

After the system becomes operational and the contract has been closed out, the agency should evaluate the development process and the system's performance so it can identify its mistakes and successes for use in future system acquisitions.

67. Determine how efficiently and effectively the system is meeting the requirements identified in the planning stage.

Management should have the agency's internal audit staff review the system after it becomes fully operational, and periodically thereafter. The reviews should use computer-assisted audit techniques to inform management about the system's operating efficiency and effectiveness.

Our study showed that reviews have helped management to insure that systems are producing accurate and useful information.

68. Document and accumulate the lessons learned.

Valuable knowledge and experience is gained from each system development. To prevent loss of knowledge and recurrence of past problems, lessons learned should be systematically accumulated for future use.

Agency management should arrange for key parties in the system development to prepare written comments on:

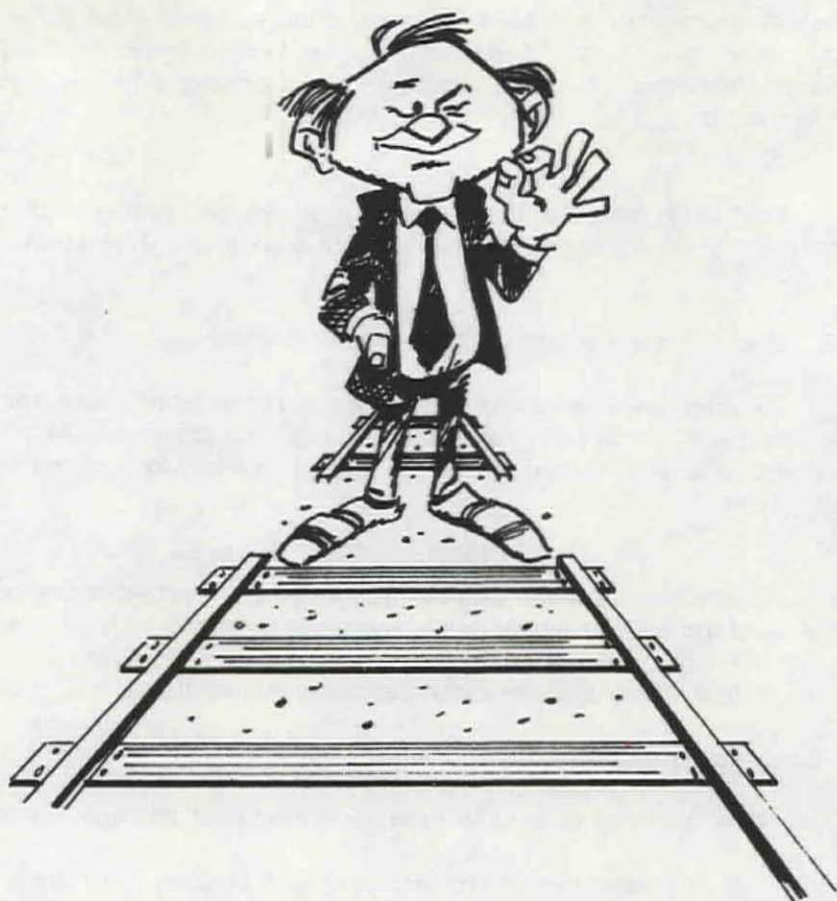
How effectively user requirements were identified.

How effectively the contractor performed.

The techniques used in system development and acquisition.

What procedures or techniques should be used in future system development projects and why.

At a minimum, the project coordinator, contractor representatives, the contracting officer, and key user personnel should be asked to comment.



This is what happens with good systems development management

GUIDANCE ITEM LISTING

DEFINING THE PROBLEM AND PLANNING FOR SYSTEM CHANGE (CH. 3)

Determining user requirements

1. Determine user requirements as the first step in modifying or initiating an information system.
2. Obtain user group agreement on all externally proposed changes.
3. Allow adequate leadtime to study requirements and to relate them to agency objectives and long-range plans.
4. Make the study's final product a statement of requirements in their order of priority.
5. Before considering design and implementation of a totally new system, examine feasible alternatives.
6. Convert each system requirement into design tasks and identify the skills needed to complete each task.
7. Identify the people available to design, develop, and implement a new system.
8. Do not consider contracting for the system design until upper management has approved the statement of requirements and design approach.

In-house development versus contracting

9. If the decision is made to internally develop a new information system, management should make as few changes as possible in personnel committed to system development.

10. If the decision is made to contract, capable agency personnel should be assigned to assist the system development.

Project coordinator selection and functions

11. Select the project coordinator as the first step after deciding to hire a contractor.
12. Select a well-qualified agency official as the project coordinator and give him or her adequate resources.
13. Document the project coordinator's authorities and responsibilities.

Planning the system's scope

14. Plan early to provide maximum communication and coordination among key personnel and groups.
15. Continuously involve all affected groups in the planning process.
16. Plan in detail to adequately identify and satisfy user requirements.
17. Direct the planning toward an organized set of detailed system requirements.

PREPARING THE WORK STATEMENT/AND SOLICITING CONTRACTORS (CH. 4)

Cooperation and communication

18. Arrange a meeting of the project coordinator and contracting officer as soon as possible after deciding to contract.

19. Confirm the continued commitment of agency officials to the proposed system before preparing the detailed work statement.

Detailed work statement

20. Set, as a primary work statement objective, understanding of the planned system, its processes, and products.
21. Identify end-product requirements clearly and completely.
22. Adequately identify and document all agency resource commitments and constraints.

Request for proposals

23. Choose the procurement approach and type of contract which will help achieve the final objective—an efficient, effective system.
24. Use sole-source procurement as a last resort.
25. Carefully consider type of contract.
26. Develop contractor selection criteria when selecting the contracting method and include the criteria in the RFP.
27. Include in the RFP all contractor administrative reporting requirements.
28. Include the acceptance test and implementation schedules in the RFP.
29. Include a glossary in the RFP to insure that system and performance requirements are understood.
30. Review the RFP for clarity, comprehensiveness, and legality before distributing it.
31. Give the RFP maximum publicity and distribution.

PROPOSAL, EVALUATION, NEGOTIATION, AND AWARD (CH. 5)

Preproposal conference

32. Conduct a preproposal conference shortly after issuing the RFP.
33. Have key agency officials involved in the system project attend the conference and answer questions.
34. Include major concerns or issues in the conference agenda and allow adequate discussion time.
35. Document the conference proceedings and distribute the record to all potential offerors.

Evaluation

36. Arrange for several knowledgeable members of the user organization to be available to answer the final offerors' questions.
37. Visit the office of each offeror.
38. Carefully select an evaluation team.
39. Review each proposal as soon as it comes in.
40. Give the panel of agency technical experts responsibility for evaluating each proposal on its technical merits.
41. Make the evaluation team responsible for indepth review of each offeror's qualifications, price quotations, overall design concept, delivery schedule, and administrative procedures.
42. Conduct a cost analysis of each proposal.
43. To avoid future litigation, adhere to the selection criteria in the RFP, document the evaluation process, and prepare to brief all unsuccessful offerors who so request.

Negotiation

44. Organize a negotiation team headed by the contracting officer.
45. Obtain basic negotiating data from each final offeror.
46. Conduct individual negotiating sessions with each offeror.
47. Insure that all information obtained during negotiations is kept confidential.

Award

48. Before the contract is awarded, submit it to the project coordinator, user group manager, and legal staff for review.
49. Promptly brief unsuccessful finalists as requested.

SYSTEM CONTRACT PERFORMANCE (CH. 6)

Quickly resolve questions and issues

50. Resolve any remaining problems which arose during previous stages.
51. Conduct an agency postaward conference.
52. Conduct a postaward conference with the contractor.

System design

53. During the contracting process, determine the system design approach.
54. Use the phased design approach whenever possible.

55. Require other functional and user group personnel to review the design for acceptability.
56. Require the contractor to state new input requirements when identified.
57. During the general design phase, have the agency's internal audit group evaluate the contractor's design for adequate audit trails and internal controls.
58. Once each phase has been approved, insure that the contractor and agency employ strict management to control change.
59. Plan and coordinate required changes as early as possible.

Implementation

60. Consider implementing the system in modules.
61. Get contractors responsible for developing the design involved in implementing the system.
62. Test the system modules and/or the total system completely before implementation.
63. Test the new system concurrently with the old one (if any) until it satisfies the design requirements.

Operation

64. Finish arrangements for operating the new system, acquire necessary resources, and train personnel before the system begins operating.
65. If required personnel are untrained, arrange for the contractor to operate the system and train the personnel.
66. Provide for contractor assistance after the system has been accepted.

RESPONSIBILITY MATRIX

Responsibility keys

P = primary

J = joint

I = involvement

GUIDANCE ITEMS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Project coordinator																								
Contracting officer																								
User activity (tech. experts)	P	P	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	J	I	I	I	I	I	I
Contractor personnel																								
Agency functional areas																								
Agency computer group																								
Internal auditors																								
Upper management																			P					
General Counsel																								

RESPONSIBILITY MATRIX

GUIDANCE ITEMS

	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Project coordinator	I		I	I	P	I	J	P	P	P	P	I	P	P	P	J	I	I	P	P	I	I	I
Contracting officer	P	P	P	P	I	J	J	I	I	I	I			I	I				I	I	I	P	
User activity (tech. experts)			I					I	I	I		I	I	I	I	I	I	I					I
Contractor personnel							J				I					J	J		I	I			I
Agency functional areas			I					I	I	I		I	I	I	I			I					I
Agency computer group			I						I	I			I	I	I		J	P	I				I
Internal auditors											P							I					I
Upper Management			I																		P		
General Counsel			I																			I	

CONTRIBUTION SOURCES

● Executive agencies:

- Department of Agriculture
- Department of Commerce
- Department of Defense
 - Department of the Air Force
 - Department of the Army
 - Department of Defense Computer Institute
 - Department of the Navy
- Department of Health, Education, and Welfare
- Department of Labor
- Department of Transportation
- General Services Administration
- Office of Federal Procurement Policy
- Office of Management and Budget
- Smithsonian Institution

● Accounting firms:

- Alexander Grant & Company
- Arthur Andersen & Co.
- Arthur Young & Company
- Coopers & Lybrand
- Elmer Fox & Company
- Ernst & Ernst
- Haskins & Sells
- Peat Marwick Mitchell & Co.
- Price Waterhouse & Co.
- Stoy, Malone and Company
- Touche Ross & Co.

● Consulting firms:

- Booz Allen & Hamilton, Inc.
- McKinsey & Company, Inc.
- Planning Research Corporation
- TRW Systems Group

● Professional societies:

- American Institute of Certified Public Accountants
(various committees, task forces, and technical directors)
- Association of Government Accountants
- District of Columbia Institute of Certified Public Accountants
- National Council of Professional Service Firms

● Joint Financial Management Improvement Program Staff