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IEEE Recommended Practice for Software Acquisition

Sponsor

**Software Engineering Standards Committee
of the
IEEE Computer Society**

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Abstract: A set of useful quality practices that can be selected and applied during one or more steps in a software acquisition process is described. This recommended practice can be applied to software that runs on any computer system regardless of the size, complexity, or criticality of the software, but is more suited for use on modified-off-the-shelf software and fully developed software.

Keywords: acquirer, modified-off-the-shelf software, software acquisition life cycle, software acquisition process, supplier

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Introduction

(This introduction is not a part of IEEE Std 1062, 1998 Edition, IEEE Recommended Practice for Software Acquisition.)

This introduction provides some background on the rationale used to develop this recommended practice. This information is meant to aid in the understanding and usage of this recommended practice.

This recommended practice describes the management and execution of software acquisition activities. It is intended for:

- Individuals or organizations that use software and acquire that software from suppliers;
- Individuals or organizations that acquire software from a developer for resale to other individuals or organizations;
- Individuals or organizations that influence how software is acquired from suppliers;
- Suppliers interested in providing high-quality software to acquirers.

This recommended practice is designed to help organizations and individuals:

- Incorporate quality considerations during the definition, evaluation, selection, and acceptance of supplier software for operational use;
- Determine how supplier software should be evaluated, tested, and accepted for delivery to end users.

This recommended practice is intended to satisfy the following objectives:

- Promote consistency within organizations in acquiring third-party software from software suppliers;
- Provide useful practices on including quality considerations during acquisition planning;
- Provide useful practices on evaluating and qualifying supplier capabilities to meet user requirements;
- Provide useful practices on evaluating and qualifying supplier software;
- Assist individuals or organizations judging the quality of supplier software for referral to end users.

The readers of this recommended practice are referred to Annexes B and C for guidelines for using this recommended practice to meet the requirements of IEEE/EIA 12207.1-1997, IEEE/EIA Guide for Information Technology—Software life cycle processes—Life cycle data.

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IEEE Recommended Practice for Software Acquisition

1. Overview

This recommended practice is divided into six clauses. Clause 1 provides the scope of this recommended practice. Clause 2 lists references to other standards that are useful in applying this recommended practice. Clause 3 provides definitions that are either not found in other standards, or have been modified for use with this recommended practice. Clause 4 establishes the nine steps involved in a software acquisition process, relates each of these steps to a major acquisition phase, and identifies the key inputs and outputs of each step. Clause 5 describes the nine steps in a software acquisition process and the related quality practices that apply to acquiring software. In order to be in compliance with this recommended practice, an implementation must adhere to Clause 5. Clause 6 summarizes the successful way to acquire high-quality products and services from software suppliers.

This recommended practice also contains three annexes. Annex A provides a set of checklists that individuals or organizations may elect to adapt to their specific needs, Annex B provides acquisition plan guidelines, and Annex C provides guidelines for compliance with IEEE/EIA 12207.1-1997.

1.1 Scope

This is a recommended practice for performing software acquisitions. It describes a set of useful quality practices that can be selected and applied during one or more steps in a software acquisition process.

In this recommended practice, software products have been classified according to the degree to which the acquirer may specify the features of the software. They are: commercial-of-the-shelf (COTS), modified-off-the-shelf (MOTS), and fully developed item.

COTS software is stable and is normally well-defined in terms of documentation and known capabilities and limitations. It usually comes with “how to operate” documentation. COTS software is defined by a market-driven need. It is commercially available and its fitness for use has been demonstrated by a broad spectrum of commercial users. Also, the COTS software supplier does not advertise any willingness to modify the software for a specific customer.

MOTS software is similar to COTS software; however, MOTS software does advertise services to tailor the software to acquirer-specific requirements.

Fully developed software will often be unique for a specific application and will be produced on a one-of-a-kind or low-volume basis. The software typically will have the potential for future modification by the acquirer to meet changing needs. As a result, most of the documentation will be special to the project (with the exception of the supplier's standard documentation for the operating system, any standard application packages, and programming languages).

This recommended practice can be applied to software that runs on any computer system regardless of the size, complexity, or criticality of the software. However, this recommended practice is more suited for use on MOTS software and fully developed software. Each organization using this recommended practice will need to identify the classes of software to which this recommended practice applies and the specific quality characteristics and activities that need to be included within the acquisition process.

1.2 Terminology

The words *shall* and *must* identify the mandatory (essential) material within this recommended practice. The words *should* and *may* identify optional (conditional) material. The terminology in this recommended practice is based on IEEE Std 610.12-1990. New terms and modified definitions as applied in this recommended practice can be found in Clause 3.

2. References

The following standards are directly referenced in this recommended practice. Table 1 provides a cross-reference of standards that address topics related to software acquisition. These standards are binding to the extent referenced within the text of this recommended practice and are referenced to avoid duplication of requirements.

IEEE Std 610.12-1990, IEEE Standard Glossary of Software Engineering Terminology.¹

IEEE Std 730-1998, IEEE Standard for Software Quality Assurance Plans.

IEEE Std 829-1998, IEEE Standard for Software Test Documentation.

IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications.

IEEE Std 1012-1998, IEEE Standard for Software Verification and Validation.

IEEE Std 1012a-1998, IEEE Standard for Software Verification and Validation: Content Map to IEEE/EIA 12207.1-1997.

IEEE Std 1016-1998, IEEE Recommended Practice for Software Design Descriptions.

IEEE Std 1028-1997, IEEE Standard for Software Reviews.

IEEE Std 1042-1987 (Reaff 1993), IEEE Guide to Software Configuration Management.

IEEE Std 1045-1992, IEEE Standard for Software Productivity Metrics.

¹IEEE publications are available from the Institute of Electrical and Electronics Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, USA (<http://www.standards.ieee.org/>).

IEEE Std 1058-1998, IEEE Standard for Software Project Management Plans.

IEEE Std 1061-1998, IEEE Standard for Software Quality Metrics Methodology.

IEEE Std 1063-1987 (Reaff 1993), IEEE Standard for Software User Documentation.

IEEE Std 1074-1997, IEEE Standard for Developing Software Life Cycle Processes.

IEEE Std 1209-1992, IEEE Recommend Practice for the Evaluation and Selection of CASE Tools.

IEEE Std 1219-1998, IEEE Standard for Software Maintenance.

ISO/IEC 9126: 1991, Information technology—Software product evaluation—Quality characteristics and guidelines for their use.²

Table 1—The relationship of software engineering standards to this recommended practice

Step	Standard	Role
All	IEEE Std 610.12-1990	Terminology
1	IEEE Std 1042-1987 IEEE Std 1058-1998 IEEE Std 730-1998	Description of quality assurance process Description of configuration management process Description of project management process
3	IEEE Std 830-1998 ISO/IEC 9126: 1991	Format and content of software requirements specification Definition of quality characteristics
4	IEEE Std 1209-1992	Description of software evaluation process
5	IEEE Std 730-1998 IEEE Std 829-1998 IEEE Std 1012-1998 IEEE Std 1016-1998 IEEE Std 1028-1997 IEEE Std 1061-1998 IEEE Std 1063-1987 IEEE Std 1074-1997	Description of quality assurance process Content of software test documentation Format and content of software V&V plan Content of design description Description of review and audit processes Description of software quality metric methodology Format and content of user documentation Description of developing software life cycle processes
7	IEEE Std 1045-1992 IEEE Std 1058-1998	Description of software productivity metrics Description of project management process
9	IEEE Std 1219-1998	Description of software maintenance process

3. Definitions

The definitions listed below establish meaning in the context of this recommended practice. Other definitions can be found in IEEE Std 610.12-1990. Note that for the purpose of this recommended practice, software includes documentation.

3.1 acquirer: A person or organization that acquires or procures a system or software product (which may be part of a system) from a supplier.

²ISO publications are available from the ISO Central Secretariat, Case Postale 56, 1 rue de Varembe, CH-1211, Genève 20, Switzerland/Suisse (<http://www.iso.ch/>). ISO publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (<http://www.ansi.org/>).

3.2 acquisition: The process of obtaining a system or software product.

3.3 commercial-off-the-shelf (COTS): Software defined by a market-driven need, commercially available, and whose fitness for use has been demonstrated by a broad spectrum of commercial users.

3.4 contract: A binding agreement between two parties, especially enforceable by law or similar internal agreement wholly within an organization, for supply of service or for the supply, development, production, operation, or maintenance of a software product.

3.5 developer: A person or organization that performs development activities (including requirements analysis, design, testing through acceptance) during the software life cycle process.

3.6 modified-off-the-shelf (MOTS): Software product that is already developed and available, usable either “as is” or with modification, and provided by the supplier, acquirer, or a third party.

3.7 request for proposal (RFP): A document used by the acquirer as a means to announce intention to potential bidders to acquire a specified system or software product (which may be part of a system).

3.8 software acquisition process: The period of time that begins with the decision to acquire a software product and ends when the product is no longer available for use. The software acquisition process typically includes nine steps associated with planning the organizational strategy, implementing an organization’s process, determining the software requirements, identifying potential suppliers, preparing contract requirements, evaluating proposals and selecting the supplier, managing supplier performance, accepting the software, and using the software.

3.9 software: Computer programs, procedures, and associated documentation and data pertaining to the operation of a computer system (see also IEEE Std 610.12-1990).

3.10 software product: The complete set of computer programs, procedures, and associated documentation and data designated for delivery to a user.

3.11 statement of work: A document used by the acquirer as a means to identify, describe, and specify the tasks to be performed under the contract.

3.12 supplier: A person or organization that enters into a contract with the acquirer for the supply of a software product (which may be part of a system) under the terms of the contract.

4. Introducing the software acquisition process

4.1 Software acquisition life cycle

The software acquisition life cycle represents the period of time that begins with the decision to acquire a software product and ends when the product is no longer available for use. It typically includes a planning phase, contracting phase, product implementation phase, product acceptance phase, and follow-on phase. This life cycle provides an overall framework within which most software acquisitions occur.

The phases in the life cycle are broadly defined by a set of milestones that establish the beginning and ending of each phase. Some phases may have a longer duration than others, or may include more activities than other phases. These phases and their key milestones are

- a) *Planning phase.* This phase begins when the idea or need is established for acquiring software and ends when the request for proposal (RFP) is released.

- b) *Contracting phase.* After the RFP is released, this phase includes activities necessary to ensure that the supplier's products and services can satisfy the acquirer's quality criteria before signing the contract.
- c) *Product implementation phase.* This phase covers the period from contract signing until the software product has been received. A key activity is monitoring the supplier's efforts to ensure that all work and milestones are satisfactorily completed prior to delivery of the software product.
- d) *Product acceptance phase.* This phase includes all activities necessary to evaluate, test, and accept the software product. It begins when the software product is received and ends when the product is accepted.
- e) *Follow-on phase.* After the software product is accepted, this phase includes using the product to meet the acquirer's objectives and evaluating user satisfaction with the software product, its documentation, and support provided from the supplier. This phase continues until all provisions provided in the contract have been completed or until the software product is no longer available for use.

Each of these phases and their key milestones are summarized in Table 2. A special feature of this table includes a listing of the software acquisition process steps associated with each life cycle phase.

Table 2—Software acquisition phase milestones

Phase	Phase initiation milestone	Phase completion milestone	Steps in software acquisition process ^a
Planning	Idea is developed	Release the RFP	1) Planning organizational strategy 2) Implementing organization's process 3) Determining the software requirements
Contracting	RFP is released	Sign the contract	4) Identifying potential suppliers 5) Preparing contract requirements 6) Evaluating proposals and selecting the supplier
Product implementation	Contract is signed	Receive the software product	7) Managing supplier performance
Product acceptance	Software product is received	Accept the product	8) Accepting the software
Follow-on	Software product is accepted	Product is no longer in use	9) Using the software

^aThe step numbers referred to in this table correlate to the nine steps outlined in 4.2.

4.2 Nine steps in acquiring quality software

The software acquisition process provides a structure of major acquisition steps that are applicable to the acquisition of either fully developed software or MOTS software. The activities contained in each step all bear upon the development of a software product with the potential for high quality. Other related project objectives may also be improved upon or enhanced through the application of quality principles. Such objectives include on-time delivery and cost-effectiveness. Utilization of the activities in this process is expected to result in the delivery of high-quality, well-documented products.

A typical software acquisition process is provided in Figure 1 for understanding of the steps that an acquirer and supplier go through. Checklists have been provided in Annex A to assist in establishing a software acquisition process.

While this process may appear to define the acquisition of fully developed software, it can be tailored to fit the acquisition of MOTS software by selecting those activities relevant to that purpose.

The steps in this process include issues that organizations should consider when acquiring fully developed software. Some of the stated principles apply to contracting for any type of service and are covered in general acquisition guidance. However, these principles are included here for completeness and to emphasize that they can indeed be applied to fully developed software contracts as well as to others.

The software acquisition process is divided into nine steps. The steps are

- Step 1:* Planning organizational strategy. Review acquirer's objectives and develop a strategy for acquiring software.
- Step 2:* Implementing organization's process. Establish a software acquisition process that fits organization's needs for obtaining a quality software product. Include appropriate contracting practices.
- Step 3:* Determining the software requirements. Define the software being acquired and prepare quality and maintenance plans for accepting software supplied by the supplier.
- Step 4:* Identifying potential suppliers. Select potential candidates who will provide documentation for their software, demonstrate their software, and provide formal proposals. Failure to perform any of these actions is basis to reject a potential supplier. Review supplier performance data from previous contracts.
- Step 5:* Preparing contract requirements. Describe the quality of the work to be done in terms of acceptable performance and acceptance criteria, and prepare contract provisions that tie payments to deliverables. Review contract with legal counsel.
- Step 6:* Evaluating proposals and selecting the supplier. Evaluate supplier proposals, select a qualified supplier, and negotiate the contract. Negotiate with an alternate supplier, if necessary.
- Step 7:* Managing supplier performance. Monitor supplier's progress to ensure all milestones are met and to approve work segments. Provide all acquirer deliverables to the supplier when required.
- Step 8:* Accepting the software. Perform adequate testing and establish a process for certifying that all discrepancies have been corrected and that all acceptance criteria have been satisfied.
- Step 9:* Using the software. Conduct a follow-up analysis of the software acquisition contract to evaluate contracting practices, record lessons learned, and evaluate user satisfaction with the product. Retain supplier performance data.

These steps may overlap or occur in a different sequence, depending upon the organizational needs. One sequence is shown in Figure 1.

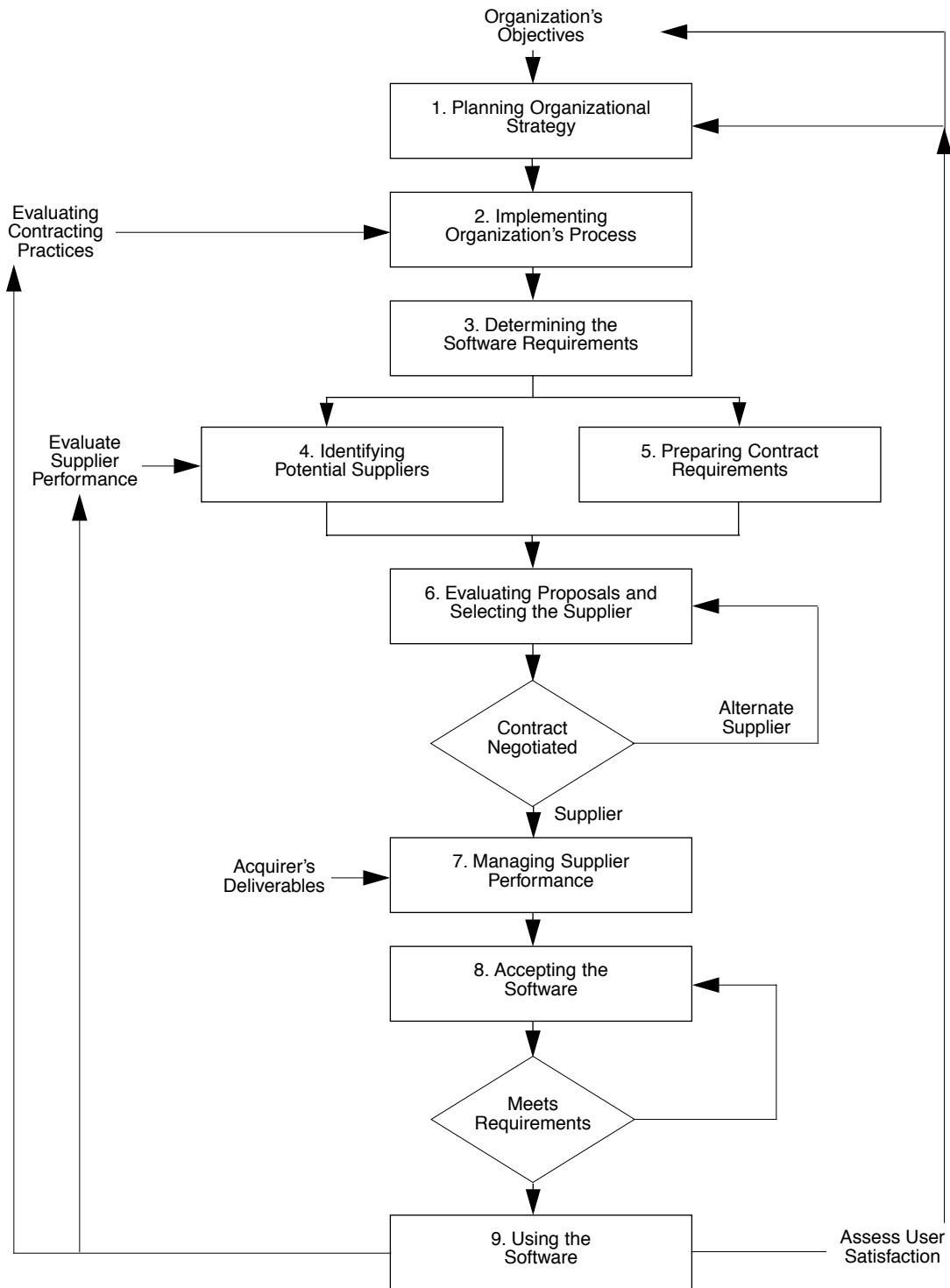


Figure 1 – Software acquisition process

Each step in the software acquisition process has certain key inputs and outputs. These are identified in Table 3. Note that outputs from various steps are also inputs to subsequent steps. Overall, defining the inputs and outputs provides a better understanding of each of the steps, which are explained in 5.1 through 5.9.

The subsequent clauses provide a solid basis for developing organizational procedures; they might also be helpful for developing ideas in an evaluation group.

5. Software acquisition process

5.1 Planning organizational strategy

When planning organization strategy do the following:

- a) Initiate a planning process;
- b) Set organizational strategy;
- c) Establish general practices.

5.1.1 Initiate a planning process

Initiate a planning process by

- a) Developing a scope for the planning process;
- b) Forming a planning group and reviewing the organization's objectives;
- c) Identifying the qualities a software product must possess to achieve the organization's objectives.

5.1.2 Set organizational strategy

Decide which quality characteristics the software should have as an aid in detailing a strategy for making acquisition of software. This strategy should include

- a) Developing a list of capabilities that would be helpful in identifying potential suppliers who could provide the needed software;
- b) Identifying responsibilities that are associated with either the supplier or the acquirer;
- c) Determining the extent of the supplier's organizational involvement in providing a high-quality product (consider the strategic areas shown in Annex A, checklist 1);
- d) Identifying those responsibilities that are best handled by the acquirer's organization or other internal sources;
- e) Identifying those responsibilities that are best included in a contract and negotiated with a supplier.

5.1.3 Establish general practices

Establish general practices to achieve consistency in negotiating and contracting with suppliers for software products. Practices for handling suppliers may be documented in a policy or operating procedure.

Table 3—Process steps—Key inputs and output

Phase	Steps ^a in software acquisition process	Inputs to the step ^b	Outputs from the step
<i>Planning</i>	1) Planning organizational strategy	<ul style="list-style-type: none"> Acquirer's objectives Strategic areas (1) 	<ul style="list-style-type: none"> Quality characteristics of software Organizational strategy for acquiring software General practices
	2) Implementing organization's process	<ul style="list-style-type: none"> Steps 3–9 of the process (see 5.3) Organizational strategy Contracting practices Organization's policies 	<ul style="list-style-type: none"> Establish a software acquisition process for organization Supplier qualification and selection process
	3) Determining the software requirements	<ul style="list-style-type: none"> Software definition (2 & 10) Supplier evaluation criteria (3) Acquirer and supplier obligations (4) Quality plan and maintenance plan content (5) 	<ul style="list-style-type: none"> Software being acquired defined Quality and maintenance plans defined Proposal evaluation standards Contingency plan RFP
<i>Contracting</i>	4) Identifying potential suppliers	<ul style="list-style-type: none"> Supplier performance data from prior contracts Supplier evaluation criteria (3) Definition of software Results being acquired User survey questionnaire (6) 	<ul style="list-style-type: none"> Information on software MOTS software/suppliers Candidate list User survey
	5) Preparing contract requirements	<ul style="list-style-type: none"> Supplier and acquirer responsibilities Supplier performance standards (7) Acquirer's terms and conditions Quality assurance clauses Payment provisions (8) 	<ul style="list-style-type: none"> Acceptance criteria Supplier performance criteria Evaluation and test criteria Tie payments to deliverables Prepared contract Legal counsel review
	6) Evaluating proposals and selecting the supplier	<ul style="list-style-type: none"> Supplier proposals Proposal evaluation standards Supplier qualification and selection process Visit supplier facilities (3) User survey results (6) Quality assurance clauses 	<ul style="list-style-type: none"> Evaluation of proposals Evaluation of suppliers Qualified suppliers list Supplier selection Negotiated contract
<i>Product Implementation</i>	7) Managing supplier performance	<ul style="list-style-type: none"> Negotiated contract Contract milestones Acquirer's deliverables provided to supplier Monitor supplier progress (9) Supplier performance criteria 	<ul style="list-style-type: none"> Work segments approved Completed milestones Software deliverables Reliability and quality measurements Feedback to supplier
<i>Product acceptance</i>	8) Accepting the software	<ul style="list-style-type: none"> Acceptance criteria Evaluation criteria (10) Test criteria (11) Quality plan Maintenance plan Supplier performance criteria Establish acceptance process (12) 	<ul style="list-style-type: none"> Acceptance process Acceptable software Usable documentation
<i>Follow-on</i>	9) Using the software	<ul style="list-style-type: none"> Software deliverables Documentation Support available Quality plan Maintenance plan 	<ul style="list-style-type: none"> Contracting practices evaluated Practices to change Practices to retain User satisfaction assessment Supplier performance data

^aThe step numbers referred to in this table correlate to the nine steps outlined in 4.2.

^bThe numbers in parentheses refer to the checklists that are in Annex A.

5.2 Implementing organization's process

When implementing organization's process

- a) Establish a software acquisition process;
- b) Include contracting practices;
- c) Obtain services from other organizations;
- d) Assign responsibility for success of software acquisition project;
- e) Tailor the process.

5.2.1 Establish a software acquisition process

A software acquisition process should be established that fits the organization's needs. The process described in 5.3 through 5.9 may be adapted to the organization's situation. The selected and established software acquisition process should be documented.

5.2.2 Include contracting practices

When establishing an acquisition process, consideration should be given to the following:

- a) Selection of contracting method(s) or agreements;
- b) Preparation of contracting exhibits describing the work required, deliverables, support, training, and acceptance requirements;
- c) Consideration of what support, training, and other activities will be provided by the supplier and what will be provided by acquirer's organizations;
- d) Assignment of negotiation and contract administration responsibilities;
- e) Initiation of a supplier qualification and selection process;
- f) Identification and preparation of educational materials for training personnel in principles and concepts of software contracting and negotiating.

5.2.3 Obtain services from other organizations

If some of the above tasks are not performed within the acquirer's organization, help should be obtained from other organizations that can provide consultation and assistance in software contracting and negotiating.

5.2.4 Assign responsibility for success of software acquisition process

Responsibility for the success of the software acquisition process should be assigned within the acquirer's organization. This assignee should have the following responsibilities:

- a) Specifying appropriate exhibits in the contract and establishing technical, performance, and quality requirements;
- b) Managing supplier performance under the contract;
- c) Assessing supplier performance during the period of the contract;
- d) Evaluating and accepting the product for the acquirer's organization.

Success of the process will depend on effective coordination. Even if specific responsibilities are assigned to various people, one person should be appointed with overall responsibility for the success of the process.

5.2.5 Tailor the process

Reference to internal policies and practices may be used for additional guidance on implementing a process for acquiring high-quality software. A reference list of information currently available within the organization should be maintained.

After acquisition process implementation, periodic tailoring may be needed to meet the changing needs and objectives of the organization. In addition, a person should be appointed who will assure that the implemented process for the organization is a good one and reflects the objectives of the organization.

5.3 Defining the software requirements

When defining the software requirements

- a) Define the software being acquired;
- b) Establish proposal evaluation standards;
- c) Establish acquirer and supplier obligations;
- d) Develop plans to evaluate and accept software and services;
- e) Develop contingency plans.

5.3.1 Define the software being acquired

The objective is to obtain from the supplier(s) realistic assessments of the size, scope, and cost of the effort required to produce the software.

The needed software, deliverables, and software support should be described as completely as possible in the RFP so that the supplier can understand and address the scope of work in the proposal. The example questions in Annex A, checklist 2, may be used as a starting point.

For fully developed software, IEEE Std 830-1998 should be used to document the requirements.

Depending upon the type of software being acquired, a request for quote or other acquisition document may be used in place of the RFP.

5.3.2 Establish proposal evaluation standards

The objective is to establish proposal evaluation criteria that ensures that the supplier most suited to do the work is selected.

An evaluation criteria should be developed to use in reviewing supplier proposals, identifying nonresponsive suppliers, and selecting a qualified supplier. The supplier's management qualifications, technical approach, quality assurance program, and proposed cost should be considered. The questions in Annex A, checklist 3, may be used.

A provision should be included in the RFP requiring inspections of supplier facilities to investigate and evaluate various factors, including financial position, technical capability, experience, and quality practices.

5.3.3 Establish acquirer and supplier obligations

The objective is to establish and clearly state the obligations of both the acquirer and the supplier. Annex A, checklist 4, may be used.

5.3.4 Develop plans to evaluate and accept software and services

Quality and maintenance plans should be developed to use in evaluating and accepting the software and services provided by the supplier. Annex A, checklist 5, may be used.

5.3.5 Develop contingency plans

Contingency plans should be developed to use in the event the supplier fails to satisfy contract requirements and the contract is then terminated. The complexity of the project and the risk in achieving the contract requirement should be considered.

5.4 Identifying potential suppliers

When identifying potential suppliers

- a) Gather information on available software products;
- b) Evaluate software during a demonstration;
- c) Survey users of the supplier's software;
- d) Review performance data from previous contracts;
- e) Survey several suppliers' offerings.

5.4.1 Gather information on available software products

Using the defined software requirements discussed in 5.3, information should be gathered about available software products. For fully developed software development, the suppliers with MOTS software should be considered. Information may be obtained from sources such as trade publications, consultants, suppliers, and user groups.

5.4.2 Evaluate software during a demonstration

Describe to the supplier what the intended use of the software product is, and ask that the demonstration include the intended use. Suppliers like to demonstrate the software at their own facility or at a customer site. This demonstration provides insight into how well the software functions, how screen displays and reports are generated by the system, how file processing is handled, and how users can interact with the system.

A potential acquirer, may find it helpful to review the supplier's documentation before the demonstration. How well the software matches the documentation may be assessed during the demonstration. However, the acquirer may prefer to have the supplier run the demonstration at a site of the acquirer's choosing and with the acquirer's test data. If this is not possible, existing users should be contacted to obtain insight from their experience in using the product or in dealing with the supplier.

5.4.3 Survey users of the supplier's software

One indicator of the quality and effectiveness of a software product is the number of satisfied companies currently using the software. Users can provide information on volume throughput planning and system degradation, and important insights on correcting software failures. The nature, quality, speed, and reliability of maintenance may be determined by exploring other users' experiences. The following should be considered:

- a) Establishing functional and performance requirements;
- b) Evaluating software product against the above;
- c) Evaluating the adequacy of the development process including the activities of quality assurance, configuration management, verification and validation, reliability measurement, documentation, and maintenance.

When preparing to contact users about a product, the questions suggested in Annex A, checklist 6, may be used. Like other evaluation tools, this can be easily modified to fit the acquirer's needs.

5.4.4 Review performance data from previous contracts

If software has been previously acquired from any of the potential candidates, it would be helpful to review performance data on each supplier from previous contracts and to determine user satisfaction with the software and supplier support.

5.4.5 Survey several suppliers' offerings

Survey suppliers' offerings, evaluating their capability to provide quality software products and services, and identify any limitations and liabilities in meeting the organization's objectives. After evaluating the suppliers on the basis of their answers to the following elements: financial soundness, experience and capabilities, development and control processes, technical assistance, quality practices, maintenance service, product usage, product warranty, costs, and contracts (a description of these elements may be used as suggested in Annex A, checklist 3), the best two or three candidates to receive the RFP should then be chosen. Each candidate should conduct a demonstration and provide formal proposals with detailed cost estimates as input to the final decision.

5.5 Preparing contract requirements

- a) Determine the quality of the work;
- b) Determine how payment is to be made;
- c) Determine nonperformance remedies;
- d) Prepare contract provisions;
- e) Review contract provisions with legal counsel.

5.5.1 Determine the quality of the work

The objective is to prepare a contract that describes the expected quality level of the finished work. The following should be included:

- a) Describe in the contract the requirement that the software must meet contract specifications. Describe in the contract's statement of work the relationship between the supplier and acquirer, and who has responsibility for each task. The list of supplier and acquirer obligations developed from Annex A, checklist 4, may be used (see 5.3.3).
- b) Describe in the contract what constitutes satisfactory performance by the supplier. Whether the specifics of the software are known or not, satisfactory performance should be quantified in terms of all known requirements and constraints (see Annex A, checklist 7).
- c) Specify who is authorized to make changes in the contract and to answer supplier questions.
- d) Consider providing in the contract means to monitor the supplier's progress. To do this, divide the development effort into logical work steps. The more undefined the software is, the closer the steps should be at the outset. The acquirer's approval should be required for each step before the development is allowed to continue to the next step. Use the five phases described in Clause 4 to assist in setting up a milestone chart showing the time frame for each work step.
- e) Identify performance as well as functional specifications.
- f) Specify the performance of an acceptance test at the time of installation.
- g) Specify the measures of reliability and quality by which the supplier's work will be evaluated.

5.5.2 Determine how payment is to be made

The objective is to prepare a contract that ties supplier payments to deliverables (see Annex A, checklist 8) and provides incentive payments associated with significant milestones, achievements, costs, or schedule.

5.5.3 Determine nonperformance remedies

Another objective of this step is to prepare a contract that provides the acquirer the right to terminate the contract if the supplier cannot perform according to the contract's terms. Use the satisfactory performance criteria and acceptance testing criteria developed from Annex A, checklist 7, to identify work that does not meet contract requirements.

Include a provision that requires the supplier to deliver, at contract termination, all materials associated with the work in progress or used in preparing any deliverables associated with the contract.

When the project is complex or when significant risk is associated with achieving the contract requirements, include a provision that requires the supplier to deposit with an escrow agent intermediate versions of source programs, statements, and documentation.

Determine whether any termination provisions may prevent or significantly delay the acquirer in exercising the organization's contingency plans (see 5.3.5).

5.5.4 Prepare contract provisions

Contract provisions should be developed to the acquirer's needs. Consideration should be given to the following when preparing the contract:

- a) Review the objectives previously described in 5.5.1. Select those provisions that represent the acquirer's business practices that influence or contribute to obtaining a high-quality product.
- b) Identify the contracting agreement that is most appropriate for acquiring software products or services from suppliers.
- c) Incorporate in the agreement the acquirer selected provisions. Review existing agreements and consider including favorable contract provisions used successfully in the past.
- d) Incorporate in the agreement appropriate contract exhibits describing the work required, deliverables, support, and training (see Annex A, checklist 2) and the acceptance requirements (see Annex A, checklist 7).

5.5.5 Review contract provisions with legal counsel

When reviewing contract provisions, modify existing provisions in the agreement as required. When these modifications affect any of the intellectual property or other legal provisions, then these modified provisions should be reviewed with the organization's legal counsel.

5.6 Evaluating proposals and selecting supplier

The objective is to ensure that a skilled and responsible supplier is selected. The supplier qualification and selection process is established as a part of the software acquisition process and includes, as a minimum, the following activities:

- a) Evaluate supplier proposals;
- b) Visit supplier facilities;
- c) Select a qualified supplier;
- d) Negotiate the contract.

5.6.1 Evaluate supplier proposals

Use the evaluation criteria established in the acquirer's proposal evaluation standards to review supplier's responsiveness to the software requirements, deliverables, and software support requirements described in the RFP. Consider the supplier's management qualifications, technical approach, quality assurance program, and proposed cost estimate.

If the supplier proposes the use of existing software products, the list of questions in Annex A, checklist 10, may be helpful.

Consider any results observed during supplier demonstrations at the supplier's site or the acquirer's site, and supplier facility visits.

Determine for whom the supplier has produced work. Solicit comments from the supplier's prior customers. The questions in Annex A, checklist 6, may be used as a guide.

Costs should be compared to other supplier's prices and schedules. Caution should be exercised when the supplier's proposed costs are much higher or lower than the average of all costs received.

Suppliers that are not completely responsive to the requirements in the RFP should be eliminated from further consideration.

5.6.2 Visit supplier facilities

During the proposal evaluation period, visit supplier facilities to investigate and evaluate various factors, including financial position, technical capability, experience, and quality practices. See Annex A, checklist 3, for ideas on evaluating supplier capabilities.

Determine whether or not the supplier's staff has experience with the required languages and with the software and hardware to be used during development. Review résumés of personnel who would be assigned to the project. Conduct interviews if needed.

Determine whether any changes are under consideration that might impact the progress of the development project, i.e., changes in organization, moving of supplier offices, or change in ownership.

5.6.3 Select a qualified supplier

Summarize the results achieved from supplier evaluations, demonstrations, and visits to supplier facilities and compare the results against the proposal evaluation standards. Select a qualified supplier from the best two or three candidates and begin negotiations.

5.6.4 Negotiate the contract

Negotiate the contract to develop, produce, and/or deliver the software with the supplier representative who has final negotiating authority. Negotiations should be based upon the existence of adequate written specifications; a definition of the obligations and responsibilities of the supplier and acquirer; the time frames in which the work is to be accomplished; and a balance of the responsibilities, risks, and benefits to both parties.

During the negotiating process, identify any problems and misunderstandings, examine potential uncertainties, regardless of whose they are, allocate the risks, and protect both parties. Consideration should be given to the following when negotiating the contract:

- a) Provide a means of avoiding disputes and of resolving disputes that arise;
- b) Provide for investing only a minimum amount of funds before the quality of the supplier's work or product is demonstrated;
- c) Provide for a maximum total price, payment amounts, or total value of the contract.

If negotiations with the selected supplier fail to produce a contract that will assure delivery of a quality product on time and properly supported, consider opening negotiations with an alternate supplier.

5.7 Managing for supplier performance

When managing for supplier performance

- a) Manage the contract during execution;
- b) Monitor the supplier's progress.

5.7.1 Manage the contract during execution

The objective is to manage the contract during execution in a manner that contributes to its success. Consideration should be given to the following when managing a contract:

- a) The acquirer should provide all of its required deliverables (e.g., equipment, software, machine time, and reference materials) to the supplier within the specified time frames so that the supplier is not delayed.
- b) When provided, such work products should be complete and accurate and provide a basis for the supplier's work. Any discrepancies should be dealt with immediately.
- c) Management should create an environment within the organization that supports the supplier's efforts. Internal disagreements should be resolved in-house by management and not left for the supplier to encounter.
- d) An individual should be appointed to deal with the supplier on all aspects of the contract. If possible, the same person who previously worked with the supplier should be kept on the project throughout the contract.
- e) An open line of communication should be maintained with the supplier. However, undocumented informal communication can lead to additional costs. Any changes in the scope of work should be handled by amending the contract.

5.7.2 Monitor supplier's progress

The objective is to monitor the supplier's progress to ensure that all milestones are met and to approve work segments (see Annex A, checklist 9). Consideration should be given to the following when monitoring supplier progress:

- a) Use the measures of reliability and quality specified in the contract to evaluate the supplier's work.
- b) Provide some means for regular and continuous feedback to the supplier on supplier performance (see Annex A, checklist 7) in terms of overall progress and on handling problems.

5.8 Accepting the software

Before accepting the software do the following:

- a) Evaluate and test the software;
- b) Maintain control over the test;
- c) Establish an acceptance process.

5.8.1 Evaluate and test the software

The objective is to adequately evaluate and test to ensure that the software meets contract specifications. Consideration should be given to the following when evaluating and testing the software:

- a) Acceptance criteria provided as a part of supplier performance standards should be kept meaningful and current. If test criteria and data were developed in the beginning, make certain they have been revised to incorporate changes, if any.
- b) Evaluations and tests should be conducted to detect the differences between existing and required conditions and to evaluate the features of the software (e.g., performance, portability, or functionality).
- c) Consideration should be given to conducting a system-level test, particularly when the software is to be used in another system. This test may be conducted in a simulated environment or in a user environment. Once it has been determined the test is needed, then it should be included in the acceptance criteria.
- d) Final acceptance criteria should include field testing results to verify performance and quality of the software in a user environment.
- e) The quality and maintenance plans developed for the project should be used in evaluating and accepting the software and services provided by the supplier.

5.8.2 Maintain control over the test

The acquirer should ensure that an appropriate amount of effort and cost is applied to assure high-quality software. Consideration should be given to the following during software testing:

- a) When evaluating a software product, the list of questions in Annex A, checklist 10, may be helpful in considering significant factors that would have some impact on the quality of the product. This list is also useful when preparing requirements for a fully developed software effort (see 5.3.1). This list may be tailored by adding other factors and questions that are important to the acquirer's organization.
- b) When testing a software product, the acquirer should have a role in the testing process. Annex A, Checklist 11, may be used in defining that role.

5.8.3 Establish an acceptance process

The objective is to ensure that all acceptance criteria have been satisfied. When the software is ready to be certified, Annex A, checklist 12, may be used to establish the certification process. Be prepared to exercise all remedies in case the supplier fails to perform.

When accepting software, final payment should not be made to the supplier until it has been certified that all the software deliverables meet contract specifications and that all acceptance criteria have been satisfied.

To the degree that nonperformance is encountered, exercise the contract provisions for withholding or reducing payments to the supplier. To minimize losses and time delays, if the contract is terminated, exercise the organization's contingency plans.

5.9 Using the software

The objective is to identify both good and bad aspects of the software acquisition and to perform necessary corrective action.

An analysis should be conducted on the software acquisition contract to evaluate contracting practices, evaluate user satisfaction with the product, and evaluate supplier performance.

5.9.1 Evaluate contracting practices

Consideration should be given to the following when evaluating contracting practices:

- a) Identify practices that are weak and need to be changed.
- b) Identify and retain practices that produced good results.
- c) Identify additional guidelines that need to be developed and implemented.

5.9.2 Evaluate user satisfaction

Consideration should be given to the following when assessing user satisfaction:

- a) Evaluate user satisfaction with the software.
- b) Record the actual amount of software maintenance work that is needed soon after the software is put into use.

5.9.3 Evaluate supplier performance

When evaluating supplier performance, retain performance data on the individual supplier for future reference.

6. Summary

Success in acquiring high-quality software products and services from software suppliers can be achieved by doing the following things:

- a) Identifying quality characteristics necessary to achieve the acquirer's objectives;
- b) Including quality considerations in the planning, evaluation, and acceptance activities;
- c) Developing an organizational strategy for acquiring software;
- d) Establishing a software acquisition process using the nine steps stated in 4.2 as a starting point;
- e) Putting the defined process into practice.

Annex A

(informative)

Checklists to assist organizations in establishing their own software acquisition process

A.1 Checklist 1: Organizational strategy

- | | | | | |
|---|----------|--------------------------|----------|--------------------------|
| 1) Who will provide software support? | Supplier | <input type="checkbox"/> | Acquirer | <input type="checkbox"/> |
| 2) Is maintenance documentation necessary? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 3) Will user training be provided by the supplier? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 4) Will acquirer's personnel need training? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 5) When software conversion or modification is planned: | | | | |
| a) Will supplier manuals sufficiently describe the supplier's software? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| b) Will specifications be necessary to describe the conversion or modification requirements and the implementation details of the conversion or modification? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| c) Who will provide these specifications? | Supplier | <input type="checkbox"/> | Acquirer | <input type="checkbox"/> |
| d) Who should approve these specifications? _____ | | | | |
| 6) Will source code be provided by the supplier so that modifications can be made? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 7) Are supplier publications suitable for end users? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| a) Will unique publications be necessary? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| b) Will unique publications require formal acceptance? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| c) Are there copyright or royalty issues? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 8) Will the software be evaluated and certified? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| a) Is a survey of the supplier's existing customers sufficient? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| b) Are reviews and audits desirable? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| c) Is a testing period preferable to demonstrate that the software and its associated documentation are usable in their intended environment? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| d) Where will the testing be performed? _____ | | | | |
| e) Who will perform the testing? _____ | | | | |
| f) When will the software be ready for acceptance? _____ | | | | |
| 9) Will supplier support be necessary during initial installations of the software by end users? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 10) Will subsequent releases of the software be made? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| a) If so, how many? _____ Will they be compatible with each other? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 11) Will the acquired software require rework whenever operating system changes occur? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| a) If so, how will the rework be accomplished? _____ | | | | |
| 12) Will the acquired software commit acquirer organization to continue some software product, such as a language, that could possibly be discontinued in the future? | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 13) What are the options/risks if the software is not required? _____ | | | | |

A.2 Checklist 2: Define the software

1) Rate the importance of the following aspects of the software being acquired.

- | | | | | |
|--|-----------|--------------------------|---------------|--------------------------|
| a) Software specification | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| b) Functional requirements | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| c) Any known constraints or parameters | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

2) Rate the importance of the deliverables to be included with the software being defined.

- | | | | | |
|--|-----------|--------------------------|---------------|--------------------------|
| a) Software description | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| b) Source code listings | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| c) Object code and listings | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| d) User manuals | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| e) Support publications | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| f) Sales and promotional material | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| g) List of current users (existing software product) | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

3) Rate the importance of the software support to be provided with the software being defined.

- | | | | | |
|----------------------------------|-----------|--------------------------|---------------|--------------------------|
| a) User training | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| b) Internal training | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| c) Post-installation support | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| d) Correction of errors | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| e) Modifications, when requested | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| f) Software warranty | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| g) Documentation warranty | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

A.3 Checklist 3: Supplier evaluation

Financial soundness	1) Can a current financial statement be obtained for examination?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Is an independent financial rating available?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Has the company or any of its principals ever been involved in bankruptcy or computer-related litigation?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) How long has the company been in business? _____				
	5) What is the company's history? _____				
Experience and capabilities	1) On a separate page, list by job function the number of people in the company.				
	2) On a separate page, list the names of sales and technical representatives and support personnel. Can they be interviewed?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) List the supplier's software products that are sold and the number of installations of each. _____				
	4) Is a list of users available?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Development and control processes	1) Are software development practices and standards used?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Are software development practices and standards adequate?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Are the currently used practices written down?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Are documentation guidelines available?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How is testing accomplished? _____				
Technical assistance	1) What assistance is provided at the installation time? _____				
	2) Can staff training be conducted on site?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) To what extent can the software and documentation be modified to meet user requirements? _____				
	4) Who will make changes to the software and documentation? _____				
	5) Will modification invalidate the warranty?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	6) Are any enhancements (software and documentation) planned or in process?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	7) Will future enhancements be made available?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Quality practices	1) Are the development and control processes followed?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Are requirements, design, and code reviews used?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) If requirements, design, and code reviews are used, are they effective?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Is a total quality program in place?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) If a total quality program is in place, is it documented?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	6) Does the quality program assure the product meets specifications?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	7) Is a corrective action process established to handle error corrections and technical questions?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	8) Is a configuration management process established?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Maintenance service	1) Is there a guarantee in writing about the level and quality of maintenance services provided?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Will ongoing updates and error conditions with appropriate documentation be supplied?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Who will implement the updates and error corrections? _____				
	4) How and where will the updates and error corrections be implemented? _____				
	5) What turnaround time can be expected for error corrections? _____				

Product usage	1) Can a demonstration of the software be made at a user site?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Are there restrictions on the purposes for which the product may be used?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) What is the delay between order placement and delivery of the product? _____				
	4) Can documentation be obtained for examination now?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How many versions or releases of the software are there? _____				
	6) Are error corrections and enhancements release-dependent?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Product warranty	1) Is there an unconditional warranty period?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) If not, is there a warranty?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Does successful execution of an agreed-upon acceptance test initiate the unconditional warranty period?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Does an unconditional warranty period provide for a specified level of software product performance for a given period at the premises where it is installed?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How long is the unconditional warranty period? _____				
Costs	1) What pricing arrangements are available? _____				
	2) What are the license terms and renewal provisions? _____				
	3) What is included in the acquisition price or license fee? _____				
	4) What costs, if any, are associated with an unconditional warranty period? _____				
	5) What is the cost of maintenance after the warranty period? _____				
	6) What is the cost of modifications? _____				
	7) What is the cost of enhancements? _____				
	8) Are updates and error corrections provided at no cost?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Contracts	1) Is a standard contract used?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Can a contract be obtained now for examination?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Are contract terms negotiable?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Are there royalty issues?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) What objections, if any, are there to attaching a copy of these checklist questions with responses to a contract? _____				

A.4 Checklist 4: Supplier and acquirer obligations

1) Definition of software development framework

- a) Were development steps to be accomplished by the supplier identified? Yes No
- b) Was a product (deliverable) included at the end of each step that demonstrates that the step has been satisfactorily completed, e.g., surveys, feasibility studies, general and detail designs, test data and test plans, the actual programs, user manuals, support publications, and integration/acceptance test results? Yes No
- c) Were milestones that must be satisfied before the development is allowed to continue to the next step identified? Yes No
- d) Were the acquirer obligations included in the same milestone chart as the supplier obligations? Yes No

2) Who is responsible for the following?

- a) Publication and expense of user documentation Supplier Acquirer N/A
- b) Publicity releases Supplier Acquirer N/A
- c) Software distribution to end users Supplier Acquirer N/A
- d) Notices and reports, if specified Supplier Acquirer N/A
- e) New software that replaces old software Supplier Acquirer N/A
- f) Appointment of a representative for
Supplier _____
Acquirer _____

A.5 Checklist 5: Quality and maintenance plans

Identify what a quality plan should contain.

- 1) What are the quality objectives?
 - a) Documentation is usable. Yes No
 - b) Warranty is adequate. Yes No
 - c) Software possesses functional capabilities that are required. Yes No
 - d) Software is verified to properly perform its functional capabilities. Yes No
- 2) What are the evaluations and tests planned to satisfy the quality objectives?
 - a) Demonstration Yes No
 - b) User survey Yes No
 - c) Test Yes No
 - d) Documentation review Yes No
- 3) Who is responsible for conducting the evaluations and tests?
 - a) Supplier Yes No
 - b) Acquirer Yes No
 - c) Third party Yes No
- 4) For which of the following items is test documentation required?
 - a) Test plans Yes No
 - b) Test procedure Yes No
 - c) Test data Yes No
 - d) Test results Yes No
- 5) The responsibility and method used to get timely correction of errors. Yes No

Identify what a maintenance plan should contain.

- 1) What are the maintenance objectives?
 - a) Support documentation is usable. Yes No
 - b) Technical support is available. Yes No
- 2) What is included in the technical support?
 - a) Error corrections Yes No
 - b) Modifications Yes No
 - c) New releases of software Yes No
 - d) Updating of user documentation Yes No
 - e) Installation assistance Yes No
 - f) Training Yes No
- 3) The responsibility of providing technical support on a timely basis.
 - a) Who provides technical support during the warranty period? Supplier Acquirer Third party
 - b) Who provides technical support after the warranty period? Supplier Acquirer Third party
 - c) Who pays for the cost of the technical support? Supplier Acquirer Third party
- 4) What acquirer responsibilities are obtained or satisfied by other organizations?
 - a) Internal organization(s) Yes No
 - b) Third party Yes No

A.6 Checklist 6: User survey

Operation	1) Is the system easy to use? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) What is the level of technical knowledge required to use and maintain the system? _____				
	3) Have there been any serious operator complaints? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Was adequate operator and support training given? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How long did it take the acquirer's operator to become familiar with the system? _____				
Reliability	1) How long has the system been in use? _____				
	2) During this time, how many updates, error corrections, and enhancements have there been? _____				
	3) Was the documentation supplied? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) How many errors have been encountered during this time? _____				
	5) What parts of the system are particularly error-prone? _____				
	6) What other parts of the system have become unusable and for how long? _____				
	7) What errors can be made that will bring the system down? _____				
	8) In the event of an error, are there any recovery procedures? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	9) How long does it take for recovery? _____				
	10) Is a diagnostic package available on site to verify that the system functions properly? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	11) Are supplier backup facilities available? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Maintenance service	1) How reliable and accessible is the supplier? _____				
	2) How frequently is maintenance service required? _____				
	3) Are supplier personnel competent in solving problems? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) What is the average turnaround time between a maintenance service call and the supplier's response? _____				
	5) Are backup procedures adequate? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	6) How long does backup take? _____				
	7) Is there anything error-prone about the procedure? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Performance	1) What are the daily transaction volumes? _____				
	2) How long does daily processing take? _____				
	3) What size are the acquirer's files? _____				
	4) What files are being used? _____				
	5) How many terminals concurrently process transactions? _____				
	6) How many users can be on the system before response time becomes sluggish, and how serious is the degradation? _____				
	7) How have multiple-user degradation problems been solved? _____				
	8) Is the acquirer's print capacity adequate? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	9) Does the system use spooling for reports? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	10) Are there any terminal lockouts when the printer is running? _____	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	11) What do you envision response time to be? _____				

Flexibility	1) What software product modifications have been done? _____		
	2) Who did the modifications? _____		
	3) Are changes done on site? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) If the changes are not done on site, where are they done? _____		
	5) How long did changes in each area take? _____		
	6) What fully developed software has been added? _____		
	7) Who added the software? _____		
	8) How long did it take? _____		
	9) Were there any interface problems? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	10) How has the system been expanded or upgraded? _____		
	11) How successful was the conversion? _____		
	12) How much time was involved? _____		
	13) How much cost was involved? _____		
	14) How many personnel were involved? _____		
Installation	1) Was the system installed as planned? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) How long did installation take? _____		
	3) How much did installation cost? _____		
	4) Was supplier installation training adequate? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	5) Was supplier installation support competent and complete? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	6) Was the system cut over smoothly? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	7) What anomalies, if any, marred the installation? _____		
	8) What environmental changes were required to install the system? _____		
Costs	1) What unanticipated charges were incurred during installation and training? _____		
	2) What unanticipated charges were incurred after installation and training? _____		
	3) Is the acquirer's service agreement cost-effective? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) What have new product enhancements from the supplier cost? _____		
	5) What charges, if any, have been incurred to update or correct software? _____		
	6) What does customized software work cost? _____		
	7) Does customized software work also include updated documentation? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	8) In what areas have you found the system to be most cost-effective? _____		
	9) In what areas have you found the system to be least cost-effective? _____		
Security	1) Are user and file security levels adequate? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) Can unauthorized transactions or programs be run? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	3) Are accounting audit controls satisfactory? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) Do accounting audit controls satisfy the acquirer's accountant? _____	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Documentation

- 1) Is the documentation accurate? Yes No
- 2) Is the documentation adequate? Yes No
- 3) Is the documentation kept up to date? Yes No

Miscellaneous

- 1) Why was the system purchased? _____
- 2) Would the system be bought today if you were in the market
for a system? Yes No
- 3) What changes would you make? _____
- 4) What changes do you think realistically could have been
implemented? _____
- 5) What did you learn from other users of the system? _____

A.7 Checklist 7: Supplier performance standards

Describe what constitutes satisfactory performance by the supplier. Satisfactory performance should be quantified in terms of all known requirements and constraints.

Performance criteria	1) Approach to meet software's functional requirements is defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) Growth potential or expansion requirements of the system is defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	3) Supplier meets time constraints for deliverables.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) Test and acceptance criteria that are to be met are defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	5) Programming language standards and practices to be followed are defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	6) Documentation standards to be followed are defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	7) Ease of modification is addressed.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	8) Maximum computer resources allowed, such as memory size and number of terminals, are defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	9) Throughput requirements are defined.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Evaluation and test	1) Software possesses all the functional capabilities required.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) Software performs each functional capability as verified by the following method(s).		
	Documentation evaluation	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	Demonstration	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	User survey	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	Test	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	3) Software errors revealed are documented.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) Software performs all system-level capabilities as verified by a system test.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Correction of discrepancies	1) Supplier documents all identified discrepancies.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) Supplier establishes discrepancy correction and reporting.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	3) Supplier indicates warranty provisions for providing prompt and appropriate corrections.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Acceptance criteria	1) All discrepancies are corrected.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	2) Prompt and appropriate corrections are provided.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	3) Satisfactory compliance to contract specifications is demonstrated by evaluations and tests.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	4) Satisfactory compliance to contract specifications is demonstrated by field tests.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	5) All deliverable items are provided.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	6) Corrective procedures are established for correction of errors found after delivery.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	7) Satisfactory training is provided.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	8) Satisfactory assistance during initial installation(s) is provided.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

A.8 Checklist 8: Contract payments

Rate the payment provisions that ensure the maximum chance for success and reward the supplier for achieving satisfactory progress.

- | | | | | |
|---|-----------|--------------------------|---------------|--------------------------|
| 1) Provide for investing only a minimum amount of funds before the quality of the supplier's work is demonstrated. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 2) Provide separate due dates and costs for each deliverable. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 3) Identify allowable printing expenses associated with publishing user documentation. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 4) Identify allowable travel and per diem expenses. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 5) Stagger the frequency and amount of supplier payments to coincide with major milestones, test results, or achievements. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 6) Identify the amount and method of determining incentive payments associated with significant results, achievements, costs, or schedules. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 7) Consider the complexity of the project and the risk in achieving the contract requirements. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 8) Include a dollar amount limit on royalty payments. Consider the amount of a fully paid license fee when setting the limit on royalties. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 9) Ensure that payments are limited to those copies of the software products and deliverables actually provided by the supplier and are not tied to forecasted quantity or dollar volumes. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 10) Withhold payment for incomplete or unacceptable work. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 11) Reduce payment if certain requirements are not met. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 12) Reduce payment to the supplier by the amount of any deliverables (e.g., documentation) specified in the contract but not produced. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 13) Withhold as a final payment some reasonable percentage of the entire contract dollar value to ensure that the supplier follows through on all deliverable items and corrects all discrepancies. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

A.9 Checklist 9: Monitor supplier progress

Rate the actions that would ensure adequate visibility of supplier progress.

- | | | | | |
|--|-----------|--------------------------|---------------|--------------------------|
| 1) Use the specified time frames that are established in the contract to determine whether the supplier's development is on schedule. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 2) Review all work at the end of each completed development step to determine if it conforms with contract specifications. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 3) Decide if the supplier's approach is technically feasible. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 4) Render timely management decisions on all alternatives presented by the supplier. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 5) Once a step is approved, freeze that work step until development is complete to stabilize the base for succeeding work steps. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 6) Apply acceptance testing to completed steps as well as at the end of the development effort. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 7) Use the measures of reliability and quality specified in the contract during step 5 (see 4.2) of the acquisition process to evaluate the supplier's work. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 8) Assess the supplier's performance in terms of the satisfactory performance criteria as specified in the contract during step 5 (see 4.2). | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 9) Provide some means for regular and continuous feedback to the supplier on supplier performance in terms of overall progress on handling problems. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

A.10 Checklist 10: Software evaluation

Functionality	1) Does the basic function of the software meet the acquirer's needs?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Are its overall capabilities consistent with the requirements of the acquirer's application?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Can the software be run under the acquirer's operating system?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Performance	1) Is the performance adequate for the acquirer's needs?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Are believable performance figures available?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) How many users can be on the system before it begins to slow down? _____				
	4) What verifiable evidence is available showing that the supplier has tested performance issues in a suitable environment? _____				
Reliability	1) Does the product have a clean, modular design?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Has it been in actual use long enough to make sure that most of its bugs have been cleaned up?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Are there errors that a user can make that will bring the system down?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) What are the recovery capabilities? _____				
Availability	1) Was the software available for actual use when it was needed?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Can another user prevent you from using the system?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) How much time is needed to correct errors that bring the system down? _____				
	4) Are recovery capabilities automated?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How long does recovery take? _____				
	6) How effectively did the supplier test the product in the acquirer's operational environment? _____				
	7) Are software errors caused by problems in performance rather than function?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Ease of modification	1) Are the software's input, output, and processing capabilities flexible enough to accommodate the changing requirements of the acquirer's business?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Can the software be adapted to new applications?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Serviceability	1) Is the software available in source code form?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) If the supplier will be doing maintenance, how reliable and accessible is the company? _____				
	3) What level and quality of maintenance will the supplier provide? _____				
	4) Is this guaranteed in writing?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) Are sets of test data available with adequate documentation about how to use them and about what results to expect?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	6) What are the opinions of past and present users? _____				
Ease of installation	1) How difficult will it be to install the software? _____				
	2) What type of training and orientation will be needed? _____				
	3) Will data files need to be converted?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Can the supplier provide procedures for the installation and conversion process?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) How much assistance will the supplier furnish during the process? _____				

Ease of use	1) Will the software be easy to use?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Is it designed for straightforward operation with a well-documented operating procedure?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Are the reports and screen displays it produces reliable, informative, and easy to interpret?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) Are help screens provided?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	5) Will the users be enthusiastic about this product?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Adequacy of documentation	1) Is the user documentation complete and up to date?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	2) Is the user documentation easy to read and understand?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Cost to acquire and use	1) What was the total cost of acquiring and using the software product? _____				
	2) Are direct costs included for the price of the software?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	3) Are direct costs included for the price of the documentation?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
	4) What are included in the indirect costs?				
	Modifying the software		<input type="checkbox"/>		
	Training personnel		<input type="checkbox"/>		
	Converting files		<input type="checkbox"/>		
	Installing the software		<input type="checkbox"/>		
	Checking out the software		<input type="checkbox"/>		
	Operating the software		<input type="checkbox"/>		
Maintaining the software after installation		<input type="checkbox"/>			
Travel expenses		<input type="checkbox"/>			

A.11 Checklist 11: Software test

Rate the actions needed to maintain adequate control over the software test.

- | | | | | |
|---|-----------|--------------------------|---------------|--------------------------|
| 1) Observe or participate in the software test. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 2) Adequately analyze the test results. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 3) Document all errors revealed by the test. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 4) Require the supplier to correct all discrepancies as a condition for final payment. (This provision must be included in the contract.) | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 5) Follow up on all discrepancies to make sure they are corrected before the software is accepted. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 6) Assure that personnel responsible for the acquirer's acceptance testing of the software have adequate technical expertise. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 7) Assign qualified personnel with systems, data processing, and performance evaluation expertise to test the software. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| 8) If personnel with the expertise to adequately evaluate the software are not available, arrange for an independent evaluation by outside sources. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

A.12 Checklist 12: Software acceptance

1. Rate actions for a certification process.

- | | | | | |
|--|-----------|--------------------------|---------------|--------------------------|
| a) Identify certification steps that are consistent with satisfying the quality and maintenance objectives documented in the Quality and Maintenance Plans. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| b) Make sure the acceptance criteria developed from checklist 7 are consistent with achieving high-quality software as planned for in the Quality and Maintenance Plans. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| c) Make sure the evaluations and tests are sufficient to satisfactorily demonstrate that all acceptance criteria can be achieved, and that the software conforms to contract specifications. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| d) Identify an individual or organization who is responsible for determining final acceptance of the software from the supplier. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| e) Document the steps involved in certifying the software. Include any useful procedure or checklist for recording significant results and determining final acceptance. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

2. Rate all remedies needed in case the supplier fails to perform.

- | | | | | |
|---|-----------|--------------------------|---------------|--------------------------|
| a) Make sure final payment is not made until the end or until certification that the software meets contract specifications and that all acceptance criteria have been satisfied. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| b) To the degree that nonperformance is encountered, exercise the contract provisions for withholding or reducing payments to the supplier. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |
| c) To minimize losses and time delays, if the contract is terminated, exercise the organization's contingency plans. | Important | <input type="checkbox"/> | Not Important | <input type="checkbox"/> |

Annex B

(normative)

Acquisition Plan guidelines

The purpose of this annex is to provide a template to guide the preparation of an Acquisition Plan (AP) based on this recommended practice.

The AP should contain the content as described in B.1 through B.8. The user of this annex may adopt any format and numbering system for the AP. The AP section numbers listed in this annex are provided to assist in the readability of this annex and are not mandatory for the user.

1. Introduction
2. References
3. Definitions
4. Software acquisition overview
 - 4.1 Organization
 - 4.2 Schedule
 - 4.3 Resource summary
 - 4.4 Responsibilities
 - 4.5 Tools, techniques, and methods
5. Software acquisition process
 - 5.1 Planning organizational strategy
 - 5.2 Implementing the organization's process
 - 5.3 Determining the software requirements
 - 5.4 Identifying potential suppliers
 - 5.5 Preparing contract documents
 - 5.6 Evaluating proposals and selecting the suppliers
 - 5.7 Managing supplier performance
 - 5.8 Accepting the software
 - 5.9 Using the software
6. Software acquisition reporting requirements
7. Software acquisition management requirements
 - 7.1 Anomaly resolution and reporting
 - 7.2 Deviation policy
 - 7.3 Control procedures
 - 7.4 Standards, practices, and conventions
 - 7.5 Performance tracking
 - 7.6 Quality control of plan
8. Software acquisition documentation requirements

Figure B.1—Example Acquisition Plan outline

B.1 (AP Section 1) Introduction

The AP should describe the specific purpose, goals, and scope of the software acquisition effort, including deviations from this recommended practice. The software acquisition for which the Plan is being written and the specific software processes and products covered by the software acquisition effort should be identified. The requirements and planned employment of the items to be acquired should be described, usually by reference. The type of contract to be used should be identified. The support concept to be used should be identified or referenced. Date of plan issue and status should be provided. Plan issuing organization and approval authority should be identified. (See Clause 4 and 5.1.)

B.2 (AP Section 2) References

The AP should identify the documents placing constraints on the acquisition, documents referenced by the AP, and any supporting documents supplementing or implementing the AP, including other plans or task descriptions that elaborate details of this plan.

B.3 (AP Section 3) Definitions

The AP should define or reference all terms required to understand the AP. All abbreviations and notations used in the AP should be described.

B.4 (AP Section 4) Software acquisition overview

The AP should describe organization, schedule, resources, responsibilities, tools, techniques, and methods necessary to perform the software acquisition process. (See Clause 4 and 5.2.)

B.4.1 (AP Section 4.1) Organization

The AP should describe the organization of the acquisition effort. The AP should describe the lines of communication with the acquisition effort, the authority for resolving issues raised in the acquisition, and the authority for approving acquisition products.

B.4.2 (AP Section 4.2) Schedule

The AP should describe how the acquisition steps will be grouped into work packages, the sequencing and relationships of steps and relationship to a master schedule (if appropriate), and how work packages are assigned to organizational elements.

B.4.3 (AP Section 4.4) Resource summary

The AP should summarize the acquisition resources, including staffing, facilities, tools, finances, and special procedural requirements (e.g., security, access rights, and documentation control). Estimates of cost and other resource requirements should be provided.

B.4.4 (AP Section 4.4) Responsibilities

The AP should identify an overview of the organizational element(s) and responsibilities for acquisition steps.

B.4.5 (AP Section 4.5) Tools, techniques, and methods

The AP should describe the special documents, tools, techniques, methods, and operating and test environment to be used in the acquisition process. Acquisition, training, support, and qualification information for each tool, technology, and methodology should be included. The AP should document the metrics to be used by the acquisition process and should describe how these metrics support the acquisition process.

B.5 (AP Section 5) Software acquisition process

The AP should identify actions to be performed for each of the software acquisition steps described in Clause 5 of this recommended practice, and should document those actions. The AP should contain an overview of the acquisition phases. (See 5.1 through 5.9.)

B.5.1 (AP Sections 5.1 through 5.9) Software acquisition process

The AP should include 5.1 through 5.9 of this recommended practice for software acquisition phases as shown in the AP outline (see Figure B.1).

The AP should address the following topics for each software acquisition step:

Step input. What is needed to perform the step.

Step output. What results when the step is performed.

Step process. The details of what a step is expected to do.

Step controls. What is to be performed to control the results of the step.

NOTE—The user of this template should examine 5.1 through 5.9 of this recommended practice for process details.

B.6 (AP Section 6) Software acquisition reporting requirements

The AP should describe how information will be collected and provided for each reporting period, including work packages completed, work packages in-work, and work packages started. Also, risks should be identified, along with their mitigation approach. (See 5.2.4.)

B.7 (AP Section 7) Software acquisition management requirements

The AP should describe the anomaly resolution and reporting; deviation policy; control procedures; standards, practices, and conventions; performance tracking; and quality control of the plan. (See 5.2.1.)

B.7.1 (AP Section 7.1) Anomaly resolution and reporting

The AP should describe the method of reporting and resolving anomalies, including the criteria for reporting an anomaly, the anomaly distribution list, and authority for resolving anomalies.

B.7.2 (AP Section 7.2) Deviation policy

The AP should describe the procedures and forms used to deviate from the Plan. The AP should identify the authorities responsible for approving deviations.

B.7.3 (AP Section 7.3) Control procedures

The AP should identify control procedures applied during the acquisition effort. These procedures should describe how software products and acquisition results should be configured, protected, and stored.

B.7.4 (AP Section 7.4) Standards, practices, and conventions

The AP should identify the standards, practices, and conventions that govern the performance of acquisition actions including internal organizational standards, practices, and policies.

B.7.5 (AP Section 7.5) Performance tracking

The AP should describe the procedures for tracking performance through all software acquisition phases for each work item.

B.7.6 (AP Section 7.6) Quality control of the Plan

The AP should describe how the Plan is reviewed, updated, and approved to ensure correctness and currency.

B.8 (AP Section 8) Software acquisition documentation requirements

The AP should describe the procedures to be followed in recording and presenting the outputs of each acquisition step. (See 5.2.1.)

Annex C

(informative)

Guidelines for compliance with IEEE/EIA 12207.1-1997

C.1 Overview

The Software Engineering Standards Committee (SESC) of the IEEE Computer Society has endorsed the policy of adopting international standards. In 1995, the international standard, ISO/IEC 12207, Information technology—Software life cycle processes, was completed. The standard establishes a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry.

In 1995 the SESC evaluated ISO/IEC 12207 and decided that the standard should be adopted and serve as the basis for life cycle processes within the IEEE Software Engineering Collection. The IEEE adaptation of ISO/IEC 12207 is IEEE/EIA 12207.0-1996. It contains ISO/IEC 12207 and the following additions: improved compliance approach, life cycle process objectives, life cycle data objectives, and errata.

The implementation of ISO/IEC 12207 within the IEEE also includes the following:

- IEEE/EIA 12207.1-1997, IEEE/EIA Guide for Information Technology—Software life cycle processes—Life cycle data;
- IEEE/EIA 12207.2-1997, IEEE/EIA Guide for Information Technology—Software life cycle processes—Implementation considerations; and
- Additions to 11 SESC standards (i.e., IEEE Stds 730, 828, 829, 830, 1012, 1016, 1058, 1062, 1219, 1233, 1362) to define the correlation between the data produced by existing SESC standards and the data produced by the application of IEEE/EIA 12207.1-1997.

NOTE—Although IEEE/EIA 12207.1-1997 is a guide, it also contains provisions for application as a standard with specific compliance requirements. This annex treats IEEE/EIA 12207.1-1997 as a standard.

In order to achieve compliance with both this recommended practice and IEEE/EIA 12207.1-1997, it is essential that the user review and satisfy the data requirements for both standards.

When this recommended practice is directly referenced, the precedence for conformance is based upon this recommended practice alone. When this recommended practice is referenced with the IEEE/EIA 12207.x standard series, the precedence for conformance is based upon the directly referenced IEEE/EIA 12207.x standard, unless there is a statement that this recommended practice has precedence.

C.1.1 Scope and purpose

Both this recommended practice and IEEE/EIA 12207.1-1997 place requirements on a Software Acquisition Plan. The purpose of this annex is to explain the relationship between the two sets of requirements so that users producing documents intended to comply with both standards may do so.

C.2 Correlation

This clause explains the relationship between this recommended practice and IEEE/EIA 12207.0-1996 in the following areas: terminology, process, and life cycle data.

C.2.1 Terminology correlation

The two standards use similar terms in similar ways. They were in development at about the same time. An early version of 12207 influenced the completion of this recommended practice. This recommended practice discusses a *software acquisition plan*, whereas IEEE/EIA 12207.0-1996 uses a broader term, *acquisition plan*, though the focus of IEEE/EIA 12207.0-1996 is software.

C.2.2 Process correlation

Both this recommended practice and IEEE/EIA 12207.0-1996 use a process-oriented approach for describing the acquisition process. The difference is that this recommended practice is focused on acquisition, whereas IEEE/EIA 12207.0-1996 provides an overall life cycle view. This recommended practice does not use the activity and task model for a process used by IEEE/EIA 12207.0-1996. It describes acquisition in terms of phases for a time view and steps for a process view. This recommended practice provides a greater level of detail about what is involved in the acquisition of software.

C.2.3 Life cycle data correlation for Software Acquisition Plans

The information required in a Software Acquisition Plan by this recommended practice and the information required in an Acquisition Plan by IEEE/EIA 12207.1-1997 are similar. It is reasonable to expect that a single document could comply with both standards.

C.2.4 Life cycle data correlation between other data in IEEE/EIA 12207.1-1997 and IEEE Std 1062, 1998 Edition

Table C.1 correlates the life cycle data other than software quality assurance plans between IEEE/EIA 12207.1-1997 and this recommended practice. It provides information to users of both standards.

Table C.1—Life cycle data correlation between other data in IEEE/EIA 12207.1-1997 and IEEE Std 1062, 1998 Edition

Information item(s)	IEEE/EIA 12207.0-1996 subclause	Kind of documentation	IEEE/EIA 12207.1-1997 subclause	IEEE Std 1062, 1998 Edition subclause
Acceptance strategy and conditions record	5.1.1.9	Record	—	5.8, A.12
Acquisition requirements record	5.1.2.1	Record	—	5.1
Concept/need determination record	5.1.1.1	Record	—	5.3, A.2
Maintenance plan	5.5.1.1	Plan	—	A.5
Problem report and problem resolution report	6.8	Report	6.10	B.7.1
Software acquisition decision rationale record	5.1.1.6	Record	—	A.3
Software quality assurance plan	6.3.1.3	Plan	6.20	A.5
Supplier selection record. (Proposal evaluation criteria, requirements compliance weighting)	5.1.3.1	Record	—	5.6, A.3
Test or validation plan	5.3.5.5, 5.3.6.5, 5.3.6.6, 5.3.7.4, 5.3.7.5, 6.5	Plan	6.27	A.11
Validation plan	6.5.1.4	Plan	—	A.10
Verification plan	6.4.1.5	Plan	—	A.10

C.3 Document compliance

This clause provides details bearing on a claim that a Software Acquisition Plan complying with this recommended practice would also achieve “document compliance” with an Acquisition Plan as prescribed in IEEE/EIA 12207.1-1997. The requirements for document compliance are summarized in a single row of Table 1 of IEEE/EIA 12207.1-1997. That row is reproduced in Table C.2 of this recommended practice.

Table C.2—Summary of requirements for a Software Acquisition Plan excerpted from Table 1 of IEEE/EIA 12207.1-1997

Information item	IEEE/EIA 12207.0-1996 subclause	Kind of documentation	IEEE/EIA 12207.1-1997 subclause	References
Acquisition plan	5.1.1.8	Plan	6.1	ASTM E731-97 ASTM E1206-97 IEEE Std 1062, 1998 Edition

The requirements for document compliance are discussed in the following subclauses:

- C.3.1 discusses compliance with the information requirements noted in column 2 of Table C.2 as prescribed by 5.1.1.8 of IEEE/EIA 12207.0-1996.
- C.3.2 discusses compliance with the generic content guideline (the “kind” of document) noted in column 3 of Table C.2 as a “plan.” The generic content guidelines for a “plan” appear in 5.2 of IEEE/EIA 12207.1-1997.
- C.3.3 discusses compliance with the specific requirements for a Software Acquisition Plan noted in column 4 of Table C.2 as prescribed by 6.1 of IEEE/EIA 12207.1-1997.
- C.3.4 discusses compliance with the life cycle data objectives of Annex H of IEEE/EIA 12207.0-1996 as described in 4.2 of IEEE/EIA 12207.1-1997.

C.3.1 Compliance with information requirements of IEEE/EIA 12207.0-1996

The information requirements for a Software Acquisition Plan are those prescribed by 5.1.1.8 of IEEE/EIA 12207.0-1996. In this case, those requirements are substantively identical to those considered in C.3.3 of this recommended practice.

C.3.2 Compliance with generic content guidelines of IEEE/EIA 12207.1-1997

The generic content guidelines for a “plan” in IEEE/EIA 12207.1-1997 are prescribed by 5.2 of IEEE/EIA 12207.1-1997. A complying plan shall achieve the purpose stated in 5.2.1 and include the information listed in 5.2.2 of that standard.

The purpose of a plan is as follows:

IEEE/EIA 12207.1-1997, subclause 5.2.1: Purpose: Define when, how, and by whom specific activities are to be performed, including options and alternatives, as required.

A Software Acquisition Plan complying with this recommended practice would achieve the stated purpose.

Any plan complying with IEEE/EIA 12207.1-1997 shall satisfy the generic content requirements provided in 5.2.2 of that standard. Table C.3 of this recommended practice lists the generic content items and, where appropriate, references the clause of this recommended practice that requires the same information.

Table C.3—Coverage of generic plan requirements by IEEE Std 1062, 1998 Edition

IEEE/EIA 12207.1-1997 generic content	Corresponding clauses of IEEE Std 1062, 1998 Edition	Additions to requirements of IEEE Std 1062, 1998 Edition
a) Date of issue and status	B.1 Introduction	—
b) Scope	B.1 Introduction	—
c) Issuing organization	B.1 Introduction	—
d) References	B.2 References	—
e) Approval authority	B.1 Introduction	—
f) Planned activities and tasks	B.5. Software acquisition process	—
g) Macro references (policies or laws that give rise to the need for this plan)	B.2. References	—
h) Micro references (other plans or task descriptions that elaborate details of this plan)	B.2. References	—
i) Schedules	B.4.2 Schedule	—
j) Estimates	B.4.3 Resource summary	—
k) Resources and their allocation	B.4.3 Resource summary	—
l) Responsibilities and authority	B.4.4 Responsibilities	—
m) Risks	B.6 Software acquisition reporting requirements	—
n) Quality control measures (NOTE—This includes quality control of the Software Acquisition Plan itself.)	B.7.6 Quality control of the Plan	—
o) Cost	B.4.3 Resource summary	—
p) Interfaces among parties involved	B.4.1 Organization	—
q) Environment/infrastructure (including safety needs)	B.4.5 Tools, techniques, and methods	—
r) Training	B.4.5 Tools, techniques, and methods	—
s) Glossary	B.3. Definitions	—
t) Change procedures and history	B.7.6 Quality control of the Plan	—

C.3.3 Compliance with specific content requirements of IEEE/EIA 12207.1-1997

The specific content requirements for an Acquisition Plan in IEEE/EIA 12207.1-1997 are prescribed by 6.1 of IEEE/EIA 12207.1-1997. A complying Acquisition Plan shall achieve the purpose stated in 6.1.1 and include the information listed in 6.1.3 of that standard.

The purpose of an Acquisition Plan is as follows:

IEEE/EIA 12207.1-1997, subclause 6.1.1: Purpose: Define the technical and managerial processes necessary to satisfy acquisition requirements.

A Software Acquisition Plan complying with this recommended practice would achieve the stated purpose.

An Acquisition Plan complying with IEEE/EIA 12207.1-1997 shall satisfy the specific content requirements provided in 6.1.3 of that standard. The specific content requirements of 6.1.3 of that standard reiterate the generic content requirements and specify that the generic requirements shall be satisfied for several activities. The activities are listed in Table C.4 of this recommended practice, along with references to the clauses of this recommended practice that specifically deal with the activity.

Table C.4—Coverage of specific Software Acquisition Plan requirements by IEEE Std 1062, 1998 Edition

IEEE/EIA 12207.1-1997 specific content	Corresponding clauses of IEEE Std 1062, 1998 Edition	Additions to requirements of IEEE Std 1062, 1998 Edition
a) (i) Acquisition process initiative	5.2 Implementing organization's process	—
a) (ii) Request-for-proposal	5.3 Determining the software requirements 5.4 Identifying potential suppliers	—
a) (iii) Contract preparation and update	5.5 Preparing contract requirements 5.6 Evaluating proposals and selecting supplier	—
a) (iv) Supplier monitoring	5.7 Managing for supplier performance	—
a) (v) Acceptance and completion	5.8 Accepting the software	—
b) Requirements for the system	5.3 Determining the software requirements	—
c) Planned employment of the system	B.1 Introduction	—
d) Type of contract to be employed	B.1 Introduction 5.5 Preparing contract requirements	—
e) Responsibilities of the organizations involved	B.4.1 Organization B.4.4 Responsibilities	—
f) Support concept to be used	B.1 Introduction	—
g) Risks considered as well as methods to manage the risks	B.6 Software acquisition reporting requirements	—

C.3.4 Compliance with life cycle data objectives

In addition to the content requirements, life cycle data shall be managed in accordance with the objectives provided in Annex H of IEEE/EIA 12207.0-1996.

NOTE—The information items covered by this recommended practice include plans and provisions for creating software life cycle data related to the basic type 'management data' in Annex H.4 of IEEE/EIA 12207.0-1996. It provides for the following management data: management plans, status reports, management indicators, criteria and key decision rationale, and contract and other procurement information.

C.4 Conclusion

Users of this recommended practice will probably find compliance with IEEE/EIA 12207.0-1996 to be a relatively straightforward exercise. The analysis suggests that any Software Acquisition Plan complying with this recommended practice will comply with the requirements of a Software Acquisition Plan in IEEE/EIA 12207.1-1997. In addition, to comply with IEEE/EIA 12207.1-1997, a Software Acquisition Plan shall support the life cycle data objectives of Annex H of IEEE/EIA 12207.0-1996.