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DETERMINING THE COST OF ACQUISITION DATA PACKAGES(U)
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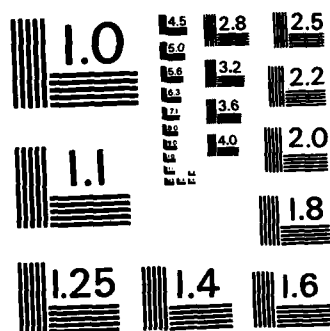
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BRMC-84-5077

DETERMINING THE COST OF ACQUISITION DATA PACKAGES

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The objectives of Analytics Phase I and II efforts under Contract No. F33615-84-C-5077 are as follows. The primary research objectives for Phase I were to identify and assess the variables which impact the cost of acquisition data packages, to identify system or hardware differences which would preclude the use of standard cost analysis techniques and to develop a preliminary cost analysis methodology. The objectives for Phase II were to evaluate and incorporate government comments in the final report and document and support the cost evaluation methodology. The research identified three groups of variables which impact data cost--measures of the system being acquired, types of included documents, and unique elements of the particular acquisition. No specific information was developed which indicated that system or hardware differences would preclude the use of the standard cost methodology being developed.					
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The dominant problem identified was that there is no agreed upon definition of what constitutes an acquisition data package. To develop the required cost methodology, the research explored the various definitions for acquisition data packages (ADPs) with their explanatory information to develop a "shopping list" of potential contents.

The methodology developed is predicated on the assumption that the contents of the ADP being acquired is defined within the solicitation, the proposal or by government technical personnel. A data base is provided that will aid the Principal Contracting Officer, Price Analyst, and Air Force technical personnel in developing estimates for the level of contractor activity associated with the creation of the required documents. Further analysis is directed toward determining the degree to which this effort should be charged to the ADP or to other contract requirements which require development of the ADP contents. The allocable costs are then totaled to develop an estimate of a fair and reasonable price. By following this methodology, it will be possible to derive what the proposed acquisition data package elements "should cost."

FORWARD

This report presents the Analytics, Inc., 4124 Linden Avenue, Suite 206, Dayton, Ohio 45432, results of Phase II of Contract No. F33615-84-C-5077, "Determining the Cost of Acquisition Data Packages."

The Phase II Final Report was developed during the period 3 January to 10 April 1985 under the direction of Mr. Thomas McCann, Project Manager (Principal Investigator).

The authors wish to thank Major James P. Weber, AFBRMC/RDCB, for his assistance in obtaining material and access to DOD employees useful in conducting this research.

This report is the second and final report of two phases concerned with determining the cost of acquisition data packages.

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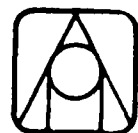


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1. STATEMENT OF THE PROBLEM

1.1 CURRENT SITUATION

The Department of Defense spends several billion dollars per year acquiring data. This significant expenditure dictates the need for a concentrated management effort to control data costs. One type of data purchased is acquisition data, the technical data used for competitive follow-on procurement of hardware items. Acquisition data is needed to obtain the economic advantages of competition with a resultant saving in procurement dollars. Certainly the cost to the government for this data warrants close and careful scrutiny. The lack of a practical methodology for determining a fair and reasonable price for acquisition data coupled with the absence of a concise definition of the composition of acquisition data has had an adverse effect on the ability of the government to support competitive acquisition of spare parts.

No formal government cost factors exist for estimating or negotiating data prices. Therefore, the Principal Contracting Officer (PCO) is on his own in determining what is an appropriate price range for required data. Further compounding the problem of evaluating the reasonableness of contractor proposed data costs is the lack of historical information on which to estimate and evaluate such data costs. Estimating procedures vary from contractor-to-contractor because of differences in recording and expensing the costs associated with data preparation, differences in use of factors or rates, and differences in data preparation methods. Hence, no accepted industry standards exist for estimating acquisition data costs.

Acquisition (or procurement) data packages are normally developed by the original manufacturer, or another manufacturer having the required expertise. The package should contain all the data necessary to manufacture and support an end item of hardware. These acquisition data packages form the basis for solicitations for competitive procurement from second or multiple sources of manufacture for the item.



The primary purpose of acquisition or reprourement data, implicit in its definition, is to gain a more competitive pricing environment for the acquisition of replacement spare parts, support equipment, and other specialized items. The cost of acquisition data has run from no charge by the manufacturer to millions of dollars. If the purpose of acquisition data is to achieve the advantages of competition and the resultant acquisition dollar savings, then the cost of such data is a vital element in the determination of whether to buy acquisition data. Excess dollars spent for acquisition data could offset the savings from competitive acquisition of the items described by the data. It is important, therefore, that the Air Force be able to determine the cost of data; but, before proposed acquisition data costs can be effectively determined, a definition of what is to be priced must be established. At the present time there exists neither formal government cost factors for estimating or negotiating data costs nor a concise definition of what the data should include.

1.2 DOD OBJECTIVE

DOD has focused attention on the spare parts acquisition process with the objective of greatly increasing the number and dollar value of spare parts which are bought under competitive conditions. To achieve their increased competition levels, acquisition data packages are required to provide adequate product description for competitive purchasing. A number of initiatives are currently underway within the Air Force primarily in response to the recommendations of the Air Force Management Analysis Group (AFMAG) for Spare Parts Acquisition. One set of these initiatives focuses on establishing and enforcing contract requirements for acquisition data packages.

A fundamental prerequisite to contracting effectively for these acquisition data packages is a methodology for assessing whether proposed costs for acquisition data are fair and reasonable. In addition, a clear understanding of the minimum requirement for an effective acquisition data package must be developed to ensure that only the data actually required for competitive purchase is acquired. This research effort focuses on the former need, the pricing methodology, but it is important to recognize that the benefits of the pricing methodology are directly related to the degree to which the requirements can be clearly defined.



1.3 PRICING ENVIRONMENT

The pricing methodology being developed under this contract is designed to support a Principal Contracting Officer (PCO) or price analyst (PA) in the evaluation of a contractor proposal for acquisition data. It is assumed that the PCO or PA will have a definition of the data package requirement, or access to government technical support to aid with the question of specific content. The pricing methodology would then be applied to a reasonably well defined requirement to establish a judgment on whether proposed prices are fair and reasonable.



2. RESEARCH OBJECTIVES

2.1 METHODOLOGY FOR EVALUATING ADP COSTS

The true cost of data needed for acquisition of spare parts on past and current systems is unknown. Therefore, tradeoff decisions are made which can result in inadequate technical data for competitive acquisition of spare parts. The objective of this research is to develop a methodology for determining the reasonableness of contractor's acquisition data cost proposals. The methodology must be validated and have practical application on a day-to-day basis in the acquisition environment.

It is frequently alleged that the cost of the acquisition data package is too much and that sufficient data is not bought because of these high costs. Individuals making cost benefit analyses concerning data acquisition must have the necessary tools to estimate and analyze data cost proposals. Thus, the cost of acquisition data items listed on the DD Forms 1423, Contract Data Requirements List (CDRL), must be capable of being analyzed.

The ultimate goal of this research effort is to provide DOD acquisition personnel with a tool for determining the reasonableness of contractor acquisition data package proposals. This tool will aid negotiation in data cost and cost benefit analyses on engineering data for competitive procurement of repairable and nonrepairable spare parts. Successful completion of the task involves integrating both the factors which influence data cost and associated cost information into a methodology which can be used by the PCO or price analyst in the evaluation of contractor proposals.

2.2 VARIATIONS IN COST

The procedure for determining the cost of any proposed effort must include a mechanism for identifying the variables impacting cost and assessing the impact of these variables. This research was directed toward identifying variables which have been shown or which are believed to impact data costs. In



addition, attention was directed toward identifying system or hardware differences that could preclude the use of the standard cost analysis techniques being developed to build accurate cost estimates.

The information gathered in this research effort supports the development of a practical methodology for estimating the reasonableness of cost proposals for acquisition data packages. Guidelines are presented to allow the user to quantify cost variations associated with system or hardware unique applicable variables.

2.3 RELATION TO USE ENVIRONMENT

Once Air Force technical personnel have identified the data required to enable competitive reprocurement, the PCO or price analyst can apply the information contained within the methodology to determine the reasonableness of contractor proposed data costs. The methodology will allow the PCO or price analyst to track the contractor's fulfillment of the data requirement and develop estimated costs for the contractor's efforts. The current lack of definition of acquisition data makes identification of the contractor's efforts difficult and presents some problems in developing standard cost estimating tools. However, the methodology will provide guidelines which can be applied to data requirements as defined by the technical personnel and within current ADP definitions. As such it will be consistent with the types of pricing aids currently in use, such as cost models, cost estimating relationships and learning curve analysis, which also depend upon an interaction between technical and contracting personnel.



3. DATA SOURCES

3.1 LITERATURE REVIEW

Listed in Sections 9 and 10 are the literature sources considered in this research effort. In addition, Analytics requested and received a DTIC Bibliography Search from the Air Force Business Research Center.

3.2 INTERVIEWS

On-site, guided interviews were conducted with each of the personnel listed in Appendix A.



4. RESEARCH METHODOLOGY

Due to the lack of historical acquisition data costs, we primarily used interviews to gather data to fulfill the research objectives. Listed in Appendix A are the personnel we interviewed. Prior to our visits, we forwarded a list of questions (Appendix B) to most offices to establish the interview structure and to assist in guiding the interviewee towards the types of information desired.

During our interviews we used the questions in Appendix B to initiate and guide the discussion. Much of the discussion period with each interviewee tended to focus on those specific areas which reflected the interviewee's experience or current job assignment. To the extent possible, the interviewer attempted to lead the discussion to specific issues, examples or historical data which related to acquisition data cost.

A comment frequently received from those interviewed dealt with the inadequacy of or lack of a concise ADP definition. This lack of definition results in the inability of the data users to adequately describe and price the data required. However, the information we received, in relation to the list of questions, enabled us to develop the framework for the cost evaluation methodology outlined in Section 6.



5. FINDINGS

5.1 SOURCES FOR DEFINING ADP

Currently there is no universally accepted definition for the required contents of an acquisition data package. Some knowledgeable sources assert that Level 3 engineering data as defined in DOD-D-1000B (Drawings, Engineering and Associated Lists) are adequate. Others state that additional data items must be included. Still others use MIL-STD-885B (Procurement Data Packages) as their guide. There is a belief that MIL-STD-885B allows for the acquisition of data for a lower level of product breakdown than is possible with DOD-D-1000B. Use of MIL-STD-885B requires the application of DOD-D-1000B and DOD-D-100 (Engineering Drawing Practices) along with other specifications and standards. Some Air Logistics Centers (ALC) "tailor" DI-E-7031, Drawings, Engineering and Associated Lists to encompass their requirements. This tailoring, which is directly opposed to the basic concept of tailoring in DOD, adds to and clarifies the specified requirements of the acquisition data package.

Although it is not the purpose of this study to specify the physical content of the data package, the types of documents and information which could be required can be summarized from DOD-D-1000B and MIL-STD-885B as follows:

- Engineering drawings to define the physical parameters of the product in sufficient detail for a second source to duplicate the item.
- Quality Assurance Procedures
- Acceptance Test Procedures
- Test Requirements Documents
- Integrated Circuit Data
- Integrated Circuit Test Documentation
- Drawing Trees
- Engineering Drawings and Associated Lists
- Punched Card Instructions
- Standards



- Models
- Packaging and Storage Information

In addition to these documents, the following types of specifications may be required.

- Interface Design
- System
- Configuration Item Development
- Configuration Item Product Fabrication
- Inventory Item
- Process
- Material
- Configuration Item Product Function

(NOTE: These are normally delivered on 35mm microfilm or aperture card as specified in the applicable contract.)

Although AFLC/AFSC Supp 1 to AFR 800-34 now contains a definition of the logistics functions for which data is required, it would be helpful if there were a single directive or guide listing the required data to achieve the objective of each function (one of which is competitive acquisition). The lack of a concise definition of required ADP content was cited as a basic problem by most of those interviewed. Existing definitions of an acquisition data package are not sufficiently explicit to achieve competitive reprourement.

5.2 VARIABLES IMPACTING DATA COST

From our discussions with personnel involved with the specification, review, purchase, and use of acquisition data packages, we identified certain elements which influence the cost of acquisition data packages. We arranged the variables or elements into three groups. We relate the first group to measures of the system being acquired and included such items as:

- System complexity
- Relative amount of data from prime and subcontractor
- Size of drawings
- Number of drawings/revisions



- Electronic or mechanical item
- Level of drawings and data
- Clarity of the SOW in explaining the desired product
- Material type
- Application of common effort to more than one data item

The second group includes the extent to which certain types of documents are included within the ADP. Some of these potential cost driver documents are:

- Schematic wiring diagram
- Mechanical system, springs, schematics, piping, construction, fluid power diagrams
- Wiring harness or cable assembly drawings
- Printed wiring diagram
- Printed wiring artwork
- Special process descriptions

The third group of variables reflect unique elements of the particular acquisition. Included are such variables as:

- Document format, i.e., microfilm, aperture card, CAD/CAM
- Different pay scales at various locations for same type work
- Contractor business practice differences in competitive situations
- Differences in offerors' accounting systems
- Data rights
- Applicable "Price Group" for over and above pricing

The final variable affecting cost is the decision on whether the acquisition data package will allow purchase of identical items or interchangeable items. The extent of data required for an identical item will in most cases be much greater than for an interchangeable item.

5.2.1 Over-and-Above Concept of Data Pricing

On most contracts the contractor prepares preliminary design, development, test and production data irrespective of the deliverable data requirements placed on the contract by the government. Defense contractors price out data



preparation efforts in a number of ways. The contractor's effort may be separately costed, included in the burden accounts, or be a part of the design and engineering effort. Current DOD pricing policy is not intended to cause contractors to change existing accounting systems to generate and identify data costs, but rather to furnish the government "estimated" (and later negotiated) "selling prices" for deliverable data items. Recognizing that much of the data required by the government are basically the same as that prepared by the contractor for his own use in satisfying the contract, the DOD in conjunction with Aerospace Industry Association developed what is known as the "over-and-above" concept. This concept requires the contractor to include in his estimated selling price on each specified data item, that portion of the development/preparation data effort expended by him solely to satisfy the government requirement for a deliverable data item.

Current DOD policy identifies four pricing conditions, known as "Price Groups," which the contractor utilizes under the "over-and-above" concept. These "Price Groups" are described as follows:

GROUP I. Group I contractor effort covers that data which the contractor has to prepare solely to satisfy the government requirement. The data are not essential to the contractor's performance of the primary contracted effort. Government pays all identifiable costs plus G&A, overhead and profit for this group. This group is the most costly to the government. An example of Group I data is technical manuals prepared for government use only. (Note: Source material for technical manuals is generally engineering drawings, the cost of which is priced independently from the selling price for the technical manuals.)

GROUP II. Group II contractor effort covers that data which is essential to the performance of the primary contracted effort however, additional "over-and-above" contractor effort is required to conform to government stated requirements such as special formats, number of copies, etc. Government pays only for that part of the task required in preparing final delivered product plus G&A, overhead and profit. Much of the data procured by the government falls in this group. An example would be engineering drawings. The estimated selling price includes the contractor effort expended after engineering and manufacturing information is developed. This price should not include research, design, layout times, etc., and should exclude all efforts from other prepared data which serve as the basis for developing design, manufacture, production or test of any end item or component that are to be delivered under the contract.



GROUP III. Group III contractor effort covers that data which the contractor must develop for his internal use and which requires no substantial change to conform to government requirements with regard to depth of content, format, frequency of submittal, preparation, and quality of data. Government pays only costs such as reproducing, handling and delivering data plus G&A, overhead and profit for this group. An example would be engineering drawings in company format and drawn to company standards as used in the manufacturer's normal plant functions.

GROUP IV. Group IV contractor effort covers that data which the contractor has developed as part of his commercial business. The government requirement for this data is minimal and the cost is also comparatively minimal, therefore, the data item is coded "No Charge."

It is mandatory that the contractor assign the proper group coding to each data item listed on the Contract Data Requirements List, DD Form 1423. The tasks associated with preparing the data item must be further identified and analyzed.

5.3 SYSTEM AND HARDWARE INFLUENCES

No information was uncovered identifying any system or hardware differences that would preclude the use of standard cost analysis techniques. One recurring comment from many of the personnel interviewed was that care must be exercised when acquiring data for mechanical systems versus electrical systems. It was their belief that DOD-D-1000B can be utilized when acquiring data for mechanical systems but not for electrical systems due to the fact that DOD-STD-100, the only preparation standard incorporated by DOD-D-1000B, does not include "test documents." Therefore, there is no standard which enables the Air Force to reject the data for lack of test information.

5.4 FUNDAMENTAL PROBLEMS

Developing a rational pricing methodology for acquisition data is, and will continue to be, hindered by a general lack of agreement on the definition of the required contents of an ADP. We found that DOD experts often asserted that they could recognize an adequate ADP; but they were unable to state the criteria which they used to make that determination. The problem of technical definition is further compounded by variation in definitions given within the guiding DOD requirement documents.



5.4.1 MIL-STD-885 Definitions

MIL-STD-885 Procurement Data Package has one definition in the definition section and an expanded version under detail requirements. Paragraph 3.2 defines a procurement data package as a generic term applicable to types of technical data when used for procurement purposes. It is a composite of specifications, plans, drawings, standards, and such other data as may be necessary to describe existing hardware to be procured by the method contemplated. (Source: MIL-STD-789) (NOTE: This definition was in 789B; it is not in 789C.)

Paragraph 4.2 identifies the various kinds of data or information and levels of detail (purchasing, manufacturing, verification, etc., information) that could be within a procurement data package, depending upon an item and its method of procurement. The top document of each procurement data package shall be the basic document under which all documents for the package are identified/assembled. There are four types of procurement data packages described within MIL-STD-885:

Competitive acquisition of identical items: A procurement data package for competitive acquisition of identical items is normally referred to as a design disclosure package. The package shall contain as a minimum, the necessary design, engineering, manufacturing, and quality support information to enable the competitive procurement, without additional design effort or recourse to the original activity, of an item that duplicates the physical and performance characteristics of the original design. It also includes process information when such is essential to accomplish manufacture by other than the original source.

Competitive acquisition of interchangeable items: A procurement data package for competitive acquisition of interchangeable items is normally referred to as a form, fit, and function package. The package shall contain as a minimum, sufficient description to enable the procurement of the same item from the original manufacturer, or the competitive procurement of a functionally and physically interchangeable item from other sources.

Competitive acquisition of items from selected sources: A procurement data package for competitive acquisition of items from selected sources is normally referred to as a form, fit, and function package. This package differs from the form, fit, and function package specified under Competitive acquisition of interchangeable items in that it depicts an existing item available on an unrestricted basis as an off-the-shelf item or an item which, while not commercially available, is procurable on order from a specialized segment of Industry. The suggested sources are normally identified in, or as a part of, this package.



Noncompetitive (sole or directed source) acquisition: A procurement data package for noncompetitive (sole or directed source) acquisition may be identified and acquired as one of the following:

- a. A design disclosure package to define a specific hardware configuration for procurement from the original source.
- b. A data list identifying the applicable documents (noting their revision) of a design disclosure package which represents a hardware configuration for procurement from the original source.
- c. A package/document that depicts an existing item which exclusively provides the performance, installation, and interchangeability characteristics required for one or more critical applications.

5.4.2 ADP Elements Cited in MIL-STD-885

The types of data which could be used to develop these procurement packages as listed in MIL-STD-885 are:

Specifications which clearly and accurately describe essential technical requirements for:

- 1) Items
- 2) Materials
- 3) Services
- 4) Procedures to determine that requirements have been met
- 5) Preservation
- 6) Packaging
- 7) Packing
- 8) Marking

Engineering data and associated lists:

- 1) Parts lists
- 2) Assembly and subassembly drawings
- 3) Installation drawings
- 4) Detail (parts) drawings
- 5) Drawings for special relationships (e.g. matched parts, altered, and selected items)
- 6) Tube bend data
- 7) Schematic wiring diagrams
- 8) Specifications and standards on drawing format used to define a hardware item in terms of materials, physical configuration, and, if applicable, performance.



Purchasing Data:

"Documents which contain information described in ASPR1-1206 or DOD-STD-100 required to purchase an item"

- 1) Specification control drawings
- 2) Source control drawings
- 3) Envelope drawings
- 4) Detail drawings
- 5) Standards
- 6) Federal Item Identification Guides
- 7) Any other document providing information which identifies and provides for acquisition of supplier-type products needed to fabricate or assemble or both into an item represented by a procurement data package.

Manufacturing Data: Manufacturing data is information essential to manufacturing and includes the required performance of special, peculiar, or unique manufacturing operations. It may include: 1) techniques; 2) procedures; and 3) processes, that describe how a part, parts, or an entire assembly is manufactured (e.g. drawings, specifications, special data).

Verification Data: Information used to check or test items to assure their proper performance and configuration as specified (e.g. specifications, standards, test equipment and facility identifications, test procedures, quality assurance provisions).

Shipping and Storage Data: Documents that describe how an item shall be packaged, transported, marked, stored, and handled.

Functional Data: Documents within a procurement data package that perform a specific function. Purchasing data is an example of functional data which may be included in a procurement data package.

Special Procurement Data: Documents prepared for a procurement data package that have no other known functional use, except for the procurement of the item.

Documents referenced in MIL-STD-885 are:

- 1) ASPR 1-1206
- 2) DOD-STD-100
- 3) DOD-D-1000
- 4) MIL-STD-789
- 5) MIL-STD-490
- 6) AFR-310-1



5.4.3 DOD-D-1000B Definitions

DOD-D-1000B may be used as the sole criterion for the acquisition data package by assuming Level 3 drawings to be adequate. According to DOD-D-1000B, these Level 3 drawings "provide engineering definition sufficiently complete to enable a competent manufacturer to produce and maintain quality control of item(s) to the degree that physical and performance characteristics interchangeable with those of the original design are obtained without resorting to additional product design effort, additional design data, or recourse to the original design activity. These engineering drawings and associated lists would:

- Reflect the end-product
- Provide the engineering data for support of quantity production
- In conjunction with other related procurement data provide the necessary data to permit competitive procurement of items essentially identical to the original item(s)."

This definition is essentially a functional definition describing the ADP in terms of what it can accomplish. DOD-D-1000B also provides guidance on typical contents of the ADP including details of:

- unique processes
- performance ratings
- dimensional and tolerance data
- critical manufacturing assembly sequences
- input and output characteristics
- diagrams
- mechanical and electrical connections
- physical characteristics - form and finish
- details of material identification
- inspection test and evaluation criteria
- necessary calibration information
- quality control data
- company specifications
- company standards
- process orders



5.4.4 Data Item Description Definitions

Data Item Description (DID) DI-P-3472A (Procurement Data Packages and Lists) provides the necessary tool to identify, select, prepare, and procure the data packages and their lists. DI-E-7031/T (Drawings, Engineering and Associated Lists) provides information necessary for the acquisition of Engineering Drawings and Associated Lists to satisfy government requirements for procurement of all data levels as defined in DOD-D-1000B.

Guidance for implementation and application of these requirements is provided in AFR-800-34 and AFLC/AFSC Supl, Acquisition Management, Engineering Data Acquisition. Paragraph 4e states, "A data list will be acquired which identifies all data to be contained in the Level 3 data package as defined by DOD-D-1000B." (However, a discrepancy exists in DOD and Air Force documentation as DOD-D-1000B does not define, identify, or even use the terms "Level 3 Engineering Data" or "Level 3 Engineering Data Package.") This regulation defines Level 3 Engineering Data as follows:

- 1) Drawings
- 2) Associated Lists
- 3) Other production documentation that supports production hardware, maintenance, modification, logistics and engineering support as well as competitive reacquisition of the contract end item.

This data includes all lower tier documentation, called out or referenced by the first tier documentation. Such documentation may include company specifications, company standards, process orders, or other design information prepared or used by the contractor (prime or associates), subcontractors, and vendors or suppliers to define a specific engineering design configuration and to translate that configuration into manufacturing items.

Engineering data is further defined by AFR 800-34 as that data required to define and document an engineering design or product configuration identification sufficient to allow duplication of the original items. This requirement includes, but is not limited to, engineering drawings, associated lists, tooling data, flat patterns, master printed circuit patterns, numerical control data, test methods and procedures, acceptance test criteria, electrical schematic and logic diagrams, configuration item specifications, computer products,



(e.g. Computer Aided Design/Computer Aided Manufacturing -- CAD/CAM) and all processes and documents referenced therein which define the physical geometry, performance characteristics, manufacture, assembly and operation of parts, assemblies, or systems.

Some additional engineering data not normally provided in a Level 3 contract end item (CEI) engineering data package may be required for competing replenishment of subtier spare parts (e.g. part level acceptance test procedures).

The goal described in AFR 800-34 is to obtain recorded information which ". . . (when viewed as a whole) describes the design and manufacture, assembly sequences, processes, performance ratings, dimensional and tolerance data, input and output characteristics, mechanical and electrical connections, and physical characteristics of the hardware. This data includes form and finish, details of material identification, inspection and test criteria, and calibration requirements."

5.4.5 Requirements for Specifying an Acquisition Data Package

The foregoing discussion provides a basis for developing a shopping list from which the necessary documentation can be selected to acquire an acceptable data package, be it engineering data or acquisition data. Listed below are numerous examples of the primary specifications governing the development of the ADP. (Although the list appears excessive, we want to emphasize the large amount of documents governing the ADP.)

Specifications

DOD-D-1000B	Drawings, Engineering and Associated Lists
MIL-D-5480	Reproduction Requirements for Engineers and Technical Data
MIL-M-9868	35mm Requirements for Microfilming Engineering Documents
MIL-Q-9858	Quality Program Requirements
MIL-I-45208	Inspection System Requirements
MIL-C-45662	Calibration System Requirements

Standards

DOD-STD-100C	Engineering Drawing Practices
MIL-STD-280	Definitions of Item Levels, et al
MIL-STD-480	Configuration Control



MIL-STD-481	Configuration Control (Short Form)
MIL-STD-490	Specification Practices
MIL-STD-721	Effectiveness Terms for Reliability, Maintainability, etc.
MIL-STD-789	Procurement Method Coding
MIL-STD-885B	Procurement Data Packages
DOD-STD-1476	Application of Metric System for New Design

Forms

DD 1418-1	Procurement Data Checklist
DD 1423	Contract Data Requirements List (CDRL)
DOD-D-1000B	Drawings, Engineering, and Associated Lists

Examples of Data Item Descriptions (DIDs) which can be listed on the DD Form 1423 in order to fulfill the above requirements are:

DI-P-3472A	Procurement Data Packages and Lists
DI-E-30142/T	Master Engineering Document Lists
DI-E-7031/T	Drawings, Engineering, and Associated Lists
DI-E-1115B (Army)	Technical Data Package

Many of the documents will be utilized for every package while others require careful consideration and trade-off as to whether the data is really necessary or cost effective.

5.4.6 AFMAG Findings

The disagreement among users regarding what documentation is required for an acquisition data package is not new. The following excerpts from the October 1983 Air Force Management Analysis Group (AFMAG) on Spare Parts Acquisition, identified some of the basic problems in fulfilling the ADP objective.

"One finding common to most studies and audits of competitive acquisition of spare parts is the lack of adequate reprourement data. Without such data, a part cannot be adequately described to allow manufacture. This problem is not new and has persisted for many years. One of the key factors causing this problem has been the ambiguous methods of describing what constitutes an adequate acquisition (reprocurement) data package.

The acquisition data package for a specific hardware item includes the engineering data for the item but may also require and include additional data, such as item peculiar test data or packaging data, needed to acquire the part com-



petitively. An adequate engineering data package is essential to form the basis of a usable acquisition data package. Therefore, a primary objective of the acquisition process is to ensure that adequate engineering data is properly developed to support acquisition data packages, in addition to the other long-term logistics functions of engineering data. These other functions include engineering, management, initial provisioning, government manufacture and maintenance/modification.

Engineering data requirements for specific contracts must be viewed in terms of the total program and the eventual uses to which the data will be put. Present procedures do not emphasize the need to review engineering data in this light. Policy and procedures need to reflect an overall coordinated strategy for the acquisition of engineering data which reflects logistics support uses. (Although AFR 800-34 requires engineering data in-process reviews to ensure that the data is technically accurate, adequate, and complies with contractual drawing preparation requirements, a comment we heard from most of those we interviewed was this could not be 100% accomplished due to a lack of DOD manpower.) Individual contract requirements must be reviewed and established within this overall strategy. This strategy needs to be included in program management planning documents such as acquisition plans, program management plans, integrated logistics support plans, and engineering data management plans.

Acquisition data packages, on the other hand, are typically not developed until after items to be spared are selected during the provisioning process -- normally in the production phase.

Based on the above, there are two distinct processes to be followed: (1) the process of obtaining engineering data and (2) the process of obtaining acquisition data packages. The policy and procedures for obtaining engineering data flow through the 800 series Air Force regulations (primarily AFR 800-34, Engineering Data Acquisition); DOD-D-1000B, Engineering Drawings and Associated Lists; DOD-STD-100C, Engineering Drawing Practices; and the data item descriptions contained in the engineering functional breakout of data. The policy and procedures for obtaining acquisition data packages flow from the 310 series of Air Force regulations (specifically AFR 310-3, Acquisition and Management of Data for Follow-On Procurements); MIL-STD-885B, Procurement Data Packages; and data item descriptions associated with this process.

There is currently a lack of cohesive, coordinated policy and procedures embodied in the above documents. Some are outdated, others are ambiguous; there is a clear need for a top-down review/revision effort."



The basic problem described in the AFMAG report still exists -- there is no clear, generally accepted definition of the contents of an acquisition data package. Efforts such as the development of costing methodologies for ADPs will continue to provide only partial solution until this fundamental problem is solved. (The specific AFMAG recommendations in this area may be found on pages 55 through 63 of the AFMAG report.)



6. PROPOSED COST EVALUATION METHODOLOGY

6.1 OVERVIEW OF METHODOLOGY

The preliminary methodology depicted in Figure 1 outlines the procedures necessary to determine the reasonableness of contractor cost proposals for engineering or acquisition data. The methodology will allow the PCO or price analyst to follow a structured review, combining both contractor and government personnel input, to derive a final price as to what the proposed ADP elements "should cost." [Identified next to each box are the variables that could impact the assessment of that activity.]

Normally, Air Force technical personnel will establish the specific requirement for the data to be acquired. This determination is based upon the structure of the data requirements system described in Section 5 and planned use of the data. As a result, the data requirement may specify (1) a full design disclosure for competitive purchase of identical items, (2) a form, fit, function description to allow for competitive purchase of interchangeable items, or (3) some other level. Our methodology is designed to support the acquisition of a full design disclosure but can be used for evaluating proposals for any set of acquisition data. The key to its use is a clear definition of the requirement and its communication to the contractor.

Upon receipt of the contractor's acquisition data cost proposal, the PCO or price analyst needs to determine if each required item or element of the ADP has been included in the proposal. If the contractor has properly responded to each element, then a determination must be made regarding the types of documents which will be submitted by the contractor and if additional data is to be requested. Examples of these types include engineering drawings and associated lists, processes, specifications, etc. The proposed quantity (and supporting rationale) for these document types must be given by the contractor or requested by the Air Force and subjected to Air Force technical evaluation for determining if the quantities are appropriate. Included in the description must be estimated page counts, if applicable. The system complexity and estimated parts



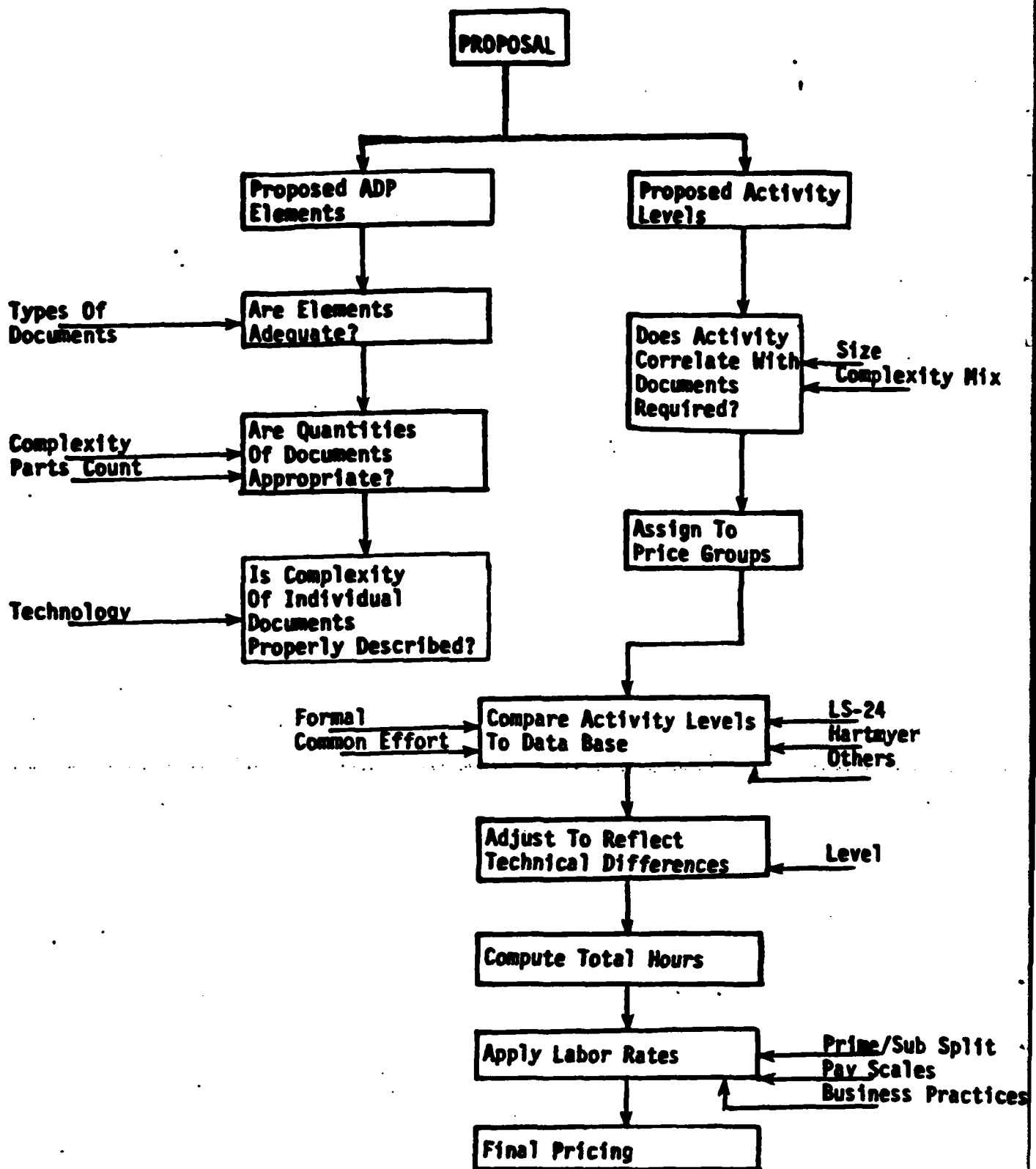


Figure 1. Pricing Methodology Overview

count of the system will need to be considered by Air Force technical personnel in determining the quantities of appropriate documents. In addition, an evaluation must be made to determine if the complexity of the individual documents has been properly described. This assessment would be based on the item design and manufacturing level of technology for which the document applies.

If the request for proposal for the acquisition data package states that the data will be of Level 3 format and the contractor has already prepared preliminary data to Level 1 or 2 format, then the contractor must define the activities required of him to fulfill Level 3 requirements. These activities may require Air Force technical evaluation to determine if the proposed activities are appropriate. If the contractor has not prepared preliminary documentation, then supporting details must be provided for the activities proposed to fulfill Level 3 requirements. Both of these activities may require engineering evaluation to determine if the proposed activities and consequent hours are appropriate.

These previous steps outline the Air Force actions necessary to define the contractor effort to prepare the required ADP elements. Defining these efforts provides a basis to conduct a cost or price analysis of the contractor proposed costs for the ADP elements.

A contractor establishes the basis of the cost estimate for preparing the ADP elements by quantifying the required inputs: labor hours and materials. Utilizing the recommended cost evaluation methodology, the PCO or price analyst can correlate the contractor's proposed activities and proposed hours (inputs) to prepare the documents (to be submitted to the Air Force) with a representative of industry data for similar document preparation. The methodology requires the Air Force personnel to obtain a definition of the type, quantity, complexity, and size of the document, level of system technology, and level of data in order to correlate the proposed hours with the provided industry data. It is, therefore, paramount that the contractor or Air Force technical personnel provide this supporting information to the PCO or price analyst to determine the reasonableness of ADP proposed costs.



Air Force understanding of the efforts the contractor proposes to undertake also assists in assigning the contractor efforts to one of the four price groups outlined on pages 5-4 and 5-5 of this report. These price groups define the over-and-above effort a contractor must undertake to satisfy the government requirement for a deliverable data item. The effort may range from reproducing and handling to total development.

The comparative tools provided in the methodology will be listings of development hours for a single page of the various documents comprising the ADP. This listing is referred to as the data listing and will be derived from sources such as: U.S. Air Force, "LS-24 Understanding and Evaluating Technical Data Prices;" Leonard M. Freeman, "Handbook of Estimating Data, Factors, and Procedures;" data gathered during Phase 1; and other available data. The information contained within this data listing will consider the various formats for which data may be supplied and the common efforts which may be undertaken. The hours listed in this data listing can be compared to the contractor's estimate for a particular effort and will form the basis of analysis.

The PCO or price analyst, following the methodology to this point, will have compiled the necessary data to allow for adjustments to the data listing values to reflect technical differences. Examples of technical differences include type, quantity, and size of the document, and level of data. The PCO or price analyst, before adjusting the data listing hours upwards or downwards, should request technical input from Air Force engineers or logisticians regarding the degree of these differences. This adjustment can apply to any or all of the hours associated with preparing an ADP element. Upon completion of this adjustment, the individual hours can be summed to obtain the total hours associated with the entire ADP.

Having obtained the total hours, the price analyst can apply selected labor rates and burdens which can reflect the appropriate wage scales, prime versus subcontractor preparation, and variations due to business practices or competitive pressures. After the labor rates, overhead and profit factors have been applied, the total derived price for the ADP can then be compared to the total proposed price to determine the reasonableness of the proposal.



6.2 SUPPORTING RATIONALE

Determining the cost associated with a contractor's effort to prepare data is dependent on two factors: the first involves what is to be delivered by the contractor, for example, drawings, material specifications, process specifications, test documentation, etc., the second is the amount of effort a contractor must expend to prepare the deliverable item. These factors require that the contractor understand the type of information to be communicated through the documentation and adequate definition by the government to the contractor of what is expected. Although we recognize the nonexistence of a single, complete definition of the contents of an acquisition data package, our methodology for pricing the ADP will take into consideration factors affecting the contractor and the government in estimating and analyzing data costs. Discussed within Section 5 of this report are many sources from which the government develops the required elements of the ADP.

A primary objective of the acquisition data package is to enable the government to reduce reprourement costs by increasing competition. This data package will allow, if it is properly prepared and contains adequate information, a contractor other than the original contractor to manufacture the same item, hence, providing the basis for increasing competition. Fulfilling this objective will require the government to formalize the contents of the ADP. To assist in fulfilling this objective, our research effort uncovered similar types of documentations described within various DOD directives, standards, regulations, etc. which identify the basic contents of the ADP. Compiled, these types of documentations form the "shopping list" from which the government can choose the applicable type to fulfill the ADP requirement. The shopping list includes:

- Engineering Drawings and Associated Lists (various sizes)
- Material Specifications
- Process Specifications
- Test Specifications
- NC Tapes
- Calibration Information
- Test Program Sets
- Packaging Data



- Company Specifications
- Company Standards
- Acceptance Test Procedures
- Integrated Circuit Data
- Test Requirements Documents
- Integrated Circuit Test Requirements
- System Specifications
- Interface Control Specifications
- Inventory Item Specifications
- Configuration Item Product Fabrication Specifications
- Configuration Item Product Function Specifications
- Drawing Trees

Various Air Logistics Centers recognize that a Level 3 engineering data package should contain much of this information but DOD-D-1000B does not specify the level at which this kind of information will be provided (spare part, LRU, etc.) and DOD-STD-100, the only preparation standard incorporated by DOD-D-1000B, does not include "test documents." Therefore, there is no standard which enables acquisition data to be rejected for lack of test information at the spare part or LRU level if the contractor does not currently test at such a level.

The following quote was provided by a Warner Robins Air Logistics Center personnel:

"During the test phase of an acquisition program, test plans, acceptance test procedures, and other test documents are required by various Data Item Descriptions (DIDs). These tests are designed to provide acceptance of the system/hardware by the most economical means. Usually the contractor's own peculiar test equipment is used in the test program and is identified in the test documents. When these documents are furnished as part of the engineering drawing package, they are intended to satisfy the requirement of DOD-D-1000, para 3.3.3.1. This data is not adequate for competitive procurement.

When data are rejected for lack of test data at spare part and component level, contractors contend that data is over and about the requirements of DOD-D-1000. Currently they are requesting a separate data item be specified in order to properly price the data.



We are currently requiring a copy of Test Requirements Documents, (DI-T-3734A), be delivered in microfilm form for all new hardware being acquired. This data will be used with the drawings delivered per DI-E-7031, Drawings, Engineering and Associated Lists, to achieve an adequate data package for competitive procurement. NOTE: (This data requirement input by the engineer/technician for use in the repair facilities). We are requiring Part A and B only be delivered for items which are source coded nonrepairable. We are also micro-filming copies of TRDs which are currently available at the ALC to supplement previously acquired data."

In developing the requirement for an ADP, government technical personnel can choose the applicable documents from the shopping list which would fulfill the ADP objective. For certain systems, not each type will be required. Other factors, such as support requirements, system peculiarities, and system level of technology will affect the decision as to what types of documentation will be required.

Having determined the types of information required from the shopping list the government then communicates its requirements through the use of the applicable Data Item Description (DID). Comments from the various personnel interviewed indicated the existence of disagreement as to the applicability of and need for certain DIDs to fulfill the ADP objective. These comments included: Level 3 data is all that is needed; current definitions within DOD-D-1000B and MIL-STD-885B are sufficient, DID's need tailoring, and that different DIDs require the same information. One recurring comment heard from most sources and personnel interviewed was that most acquisition data, as currently being received, is not adequate for reprocurement. (It is not the intent of this research effort to determine the adequacy of acquisition data for reprocurement purposes.) This reflects continued existence of the problem cited by the AFMAG leading to their recommendation to develop a standard DID for acquisition data packages.

Determining the cost to be borne by the government in obtaining the ADP depends on the current pricing method and the definition of the ADP. Although numerous DIDs exist which enable the government to acquire the necessary data, the contractor employs specific types of resources to supply the documentation required by the DID. These resources are primarily directed toward drafting,



writing, editing, and illustrating. It is this effort which must be identified by the contractor before a price can be established for the ADP. If the contractor has previously prepared the necessary documentation for other contractual requirements, then the cost of the ADP preparation should represent only reproduction. The responsibility for determining the efforts a contractor must undertake and the associated costs to be incurred by the contractor to supply the ADP will be that of the PCO, price analyst, and Air Force technical personnel. Identified previously in this report are the variables which impact data costs. It is the isolation of one or a combination of variables which present the uniqueness of the ADP. Only the government personnel familiar with the system, subsystem, or part can properly decide what will constitute the required ADP, which variables will impact cost, and the expected efforts of the contractor.

The costing methodology described above reflects a baseline cost associated with a contractor's effort to prepare the type of documentation indicated in the "shopping list" and communicated through a DID. The sequence of events required of government personnel and the contractor prior to the Air Force utilizing our costing methodology are outlined below.

1. Government personnel select from the shopping list the type or types of documentation required.
2. Appropriate Data Item Descriptions (DIDs) to communicate these documents requirements through the DD Form 1423.
3. Separate pricing of ADP effort is required.

6.3 SHORTCOMINGS OF PROPOSED METHODOLOGY

The methodology being developed under this research effort depends upon the government providing a definition of the detailed contents of the acquisition data package. Based upon this definition, a "Should Cost" type of estimate for the data package can be developed. A "Should Cost" requires intensive effort by the Air Force to develop an estimate of the efforts a contractor must undertake to supply the data package. The results of the Air Force effort will provide a firm basis for determining if the price proposed by the contractor is fair and reasonable. The ability to make this determination also depends on the



assumption that the price proposed by the contractor for the acquisition data package is separately stated.

If there are differences between the proposed cost and the cost developed through application of the proposed methodology, resolving these differences will depend upon the contractor being able to provide details of the estimating methodology used. Our research indicated that this type of detail is rarely available.

Another shortcoming of the proposed methodology is that the variables identified by the government personnel we interviewed will need to be quantified by government technical personnel familiar with the system and data being acquired. While the qualitative effect of these variables can be described, no information was available to measure nor standardize the specific degree of cost impact. Technical judgment on the part of the government evaluation team will be required to define the cost impact for the specific acquisition data package being estimated.

6.4 ALTERNATIVE METHODOLOGIES

Two alternative methodologies considered were a parametric estimating relationship and a data cost to cost estimating relationship. Either of these methodologies would provide a valuable tool in that estimates could be developed rapidly and without the need to precisely define the contents of a specific data package. However, both these approaches depend upon the existence of historical data on the cost of or price paid for acquisition data. This type of data is not available within Air Force or other DOD cost repositories. Without such historical cost data, the issue of fair and reasonable pricing must be addressed on the basis of an estimate of the work content required to create the specific item purchased, in this case the acquisition data package.



7. ACCOMPLISHMENTS OF PHASE II ACTIVITY

7.1 HANDBOOK DEVELOPMENT

Baseline hours developed represent the efforts a contractor must undertake in preparing the elements of the ADP. These efforts are associated with preparing the types of documentations listed in the "shopping list." The baseline values, stated in hours, will represent the effort to develop a single page of a document. Document categories of simple, average, and complex are provided with their respective hours. Without historical cost data nor a formalized definition of the contents of an ADP, we do not present a breakdown of the specific data required for different systems. We were told, however, that although system differences are not a significant cost variable, electrical systems, as compared to mechanical systems, will require additional test data at the spare part and LRU level.

7.2 METHODOLOGY REFINEMENT

Contained within the handbook is the methodology which DOD acquisition personnel can utilize in determining the reasonableness of contractor's acquisition data cost proposals. The methodology overview described in Section 6.1 is refined to present a more sequential flow of activities required of the DOD acquisition personnel and a more detailed description of the impact of the variables. Government comments on the Phase I report have been evaluated and incorporated in the final methodology and in this report.



7.3 CONTACTS AND INTERVIEWS

All of the following were either contacted by telephone or interviewed person to person.

<u>Organization/Job Title</u>	<u>Location</u>	<u>Name</u>
AMSAV/LI	St. Louis, MO	Paul Golden
AMSAV/ELB	St. Louis, MO	Bob Faberberg
AH-64 Conf Mgt	St. Louis, MO	Jim Hemmer
DRSAV-3	St. Louis, MO	Jim Brennan
ARPRO	Hughes - Mesa, AZ	Bob Small
AMSMI-EDC	Redstone Arsenal, Huntsville, AL	Leland Womack
General Dynamics	Fort Worth, TX	J.L. Boteler
DCAA Dallas	Fort Worth, TX	Sam McCullough
DCAA Pricing	Fort Worth, TX	P.C. Higgins
DCAA Price Analyst	Fort Worth, TX	L. Shipley
AFPRO/Engineer	Fort Worth, TX	Roj Allen
AFPRO/Coordinator	Fort Worth, TX	Cpt. Mack
AFPRO/Engineer	Fort Worth, TX	Dale Mazachek
AFPRO/Engineer	Fort Worth, TX	B. Edupuganti
DCASR, Dallas	Dallas, TX	Wayne Ocnaschek
DCASMA	Phoenix, AZ	Ed Stehle
DCASMA/Contracts	Phoenix, AZ	Judy Nelson
SA-ALC/CRESC	Kelly AFB, TX	Ernest Rodriguez
SA-ALC/CRESC	Kelly AFB, TX	Ed Gonzales
SA-ALC/MATT	Kelly AFB, TX	Jim Sides
SA-ALC/MATT	Kelly AFB, TX	Ed Garland
SA-ALC/MMK	Kelly AFB, TX	Jerry Cothran
OC-ALC/CREE	Tinker AFB, OK	Bob Ritten
OC-ALC/CREE	Tinker AFB, OK	Jim Hill
OC-ALC/CREE	Tinker AFB, OK	Mike Skinner
OC-ALC/CREE	Tinker AFB, OK	Marvin W. Woodworth
OC-ALC/MMEDO	Tinker AFB, OK	Lionel Turner
OO-ALC/MME	Hill AFB, UT	Lee Kidman
OO-ALC/MME	Hill AFB, UT	Grant Likens
OO-ALC/MME	Hill AFB, UT	Iris Nicholas
OO-ALC/CRE	Hill AFB, UT	Fred Andrew
OO-ALC/CREAV	Hill AFB, UT	Ralph Taylor



<u>Organization/Job Title</u>	<u>Location</u>	<u>Name</u>
OO-ALC/CREA	Hill AFB, UT	Chet Humenluck
OO-ALC/MMGMA	Hill AFB, UT	Anita Bean
OO-ALC/MMA	Colocated WPAFB, OH	Brent Barrett
SM-ALC/CR (Chief)	McClellan AFB, CA	Col John Beoddy
SM-ALC/CR (Deputy)	McClellan AFB, CA	Joe Sullivan
SM-ALC/CRE	McClellan AFB, CA	Terry Johnson
SM-ALC/CREA	McClellan AFB, CA	Tom Howell
SM-ALC/MMED (EDCARS)	McClellan AFB, CA	Larry Corbin
SM-ALC/MMEDS	McClellan AFB, CA	Diane Combs
SM-ALC/MMEDS	McClellan AFB, CA	Karen Freeman
SM-ALC/MMED	McClellan AFB, CA	Jim Blackwell
WR-ALC/CRE	Robins AFB, GA	Louise Nix
AFPRO Contracts	Kirtland AFB, NM	Gary Thurken
AFPRO/Public Affairs	Kirtland AFB, NM	Lindana Humphrey
AFPRO/LMO	Northrop, Hawthorne, CA	Henry Popell
AFPRO/LS	Northrop, Hawthorne, CA	Virginia Roberts
AFPRO/TM	Douglas, Long Beach, CA	Stanley Miller
AFPRO/TM	Douglas, Long Beach, CA	Randi Kami
AFPRO/Engineer	Douglas, Long Beach, CA	Bill Chapman
AFPRO/Engineer	Douglas, Long Beach, CA	Doug Reinhold
AFPRO/AC (B-1)	Rockwell, Hawthorne, CA	Thomas Tremper
AFPRO/ACO	Rockwell, Hawthorne, CA	Josephine Ross
AFPRO/EP	Rockwell, Hawthorne, CA	Cpt Bob Cooper
AFPRO/EP	Rockwell, Hawthorne, CA	Frank Nelson
AFPRO/EP	Rockwell, Hawthorne, CA	Larry Dailey
USAF/LEY	Washington, DC	Twila Dearing
NAVAIR/A412A	Navair, Washington, DC	Marsh Wallace
Garrett	Phoenix, AZ	Jim Harvey
Garrett (Customer Spt)	Phoenix, AZ	Maurey Aurand
Garrett (R&D Sales)	Phoenix, AZ	Roger Hildenbrand
F-109 Engine SPO	WPAFB, OH	Maj Joseph Loper
F-16/YPCC	WPAFB, OH	Jerry Marshall
F-16/YPCC	WPAFB, OH	Jerry Bowen
ASD/AWZ	WPAFB, OH	I.M. Guterman
B-1 (Data)	WPAFB, OH	Cpt Greenwood
B-1 (Data)	WPAFB, OH	LT Tracy Rochester
ASD/ALX	WPAFB, OH	Charley McArthur
AFSC/AMIS	WPAFB, OH	Sol Valentine
AFALC/PTE	WPAFB, OH	Jim Harris
AFALC/PTLA	WPAFB, OH	Andrea Wright
AFLC/CR	WPAFB, OH	Robert Sands
ESD	Hanscom AFB, MA	Roland Usher
ESD	Hanscom AFB, MA	Gerry Menyhart
ESD	Hanscom AFB, MA	Paul Courtegeous



Organization/Job TitleLocationName

ESD
AFPRO
DOD/PESO
Hqs AFSC
AFSC/PMC
USAF/RDC
USAF/RDXM

Hanscom AFB, MA
Westinghouse, Balt, MD
Washington, DC
Andrews AFB, MD
Andrews AFB, MD
Washington, DC
Washington, DC

Joe LaBelle
Major Craig Chapman
Joe Arcieri
Major Mike Brown
Ron Luftman
Col Messamore
Charlie Marshall



7.4 LIST OF QUESTIONS FOR INTERVIEWS

1. Have you purchased any data for inclusion in acquisition data packages (ADPs)? If you have, how was the pricing developed? Have you had any exposure to ADP cost data?
2. If problems have been encountered with acquisition data packages used for competitive purchase, what type of acquisition data package problems have arisen? If the ADP was insufficient or incomplete, what types of information were missing or deficient?
3. In your screening of items for breakout, are there any elements of data that are consistently not available in ADPs which are incomplete?
4. Based on your experience, what types of information would be necessary to perform an adequate analysis of a proposed price for acquisition data packages?
5. Contained within MIL-STD-885B, "Procurement Data Packages," are the major types of information necessary to fulfill acquisition (procurement) data packages. These major types include: engineering data and associated lists; purchasing data; manufacturing data; verification data; shipping and storage data; functional data; and special procurement data. How complete are the elements of data listed in these major types for fulfilling the objective of an acquisition data package (ADP)?
6. What are other sources for identification of elements comprising an adequate ADP? How thorough are they?
7. Can a consolidated list of all information required for an ADP be generated from these sources?
8. Is Level 3 data, as defined in DOD-D-1000B, data adequate for competitive reprocurement?
9. How would you like to see the Air Force manual/handbook structured?
10. What would a person using our manual need to know before the manual could be effectively utilized? (i.e., number of drawings, type of system, etc.)
11. What are the variables influencing data costs? What impact do these variables have on data costs?
12. We anticipate our handbook reflecting baseline values for the efforts undertaken by a contractor to prepare Level 3 data or an ADP. What types of system or hardware differences might preclude the use of such a standard cost analysis technique?



13. What criteria do your organization utilize to inspect an acquisition data package?
14. What types of software or software documentation are submitted in fulfilling the ADP requirement? How adequate is this type of information?

We have identified some typical cost elements related to software data which include:

- Conversion of CAD/CAM data to standard formats.
 - Copying existing software (such as NC programs) for delivery.
 - Conversion of unique CNC software to generally accepted languages.
 - Digitizing engineering data for input to systems such as DSREDS.
 - Reprogramming of technical data in contractor computer systems to generally available languages.
 - Documentation of software, including when necessary, software codes, operator manuals and diagnostic software.
15. Are you aware of other software related costs for acquisition data packages? What types of problems have been encountered with software or software documentation?
 16. How is the software or software documentation priced?
 17. What other topics would you recommend for investigation under this project?
 18. Names and phone numbers of other contacts interviewee believes we should contact.



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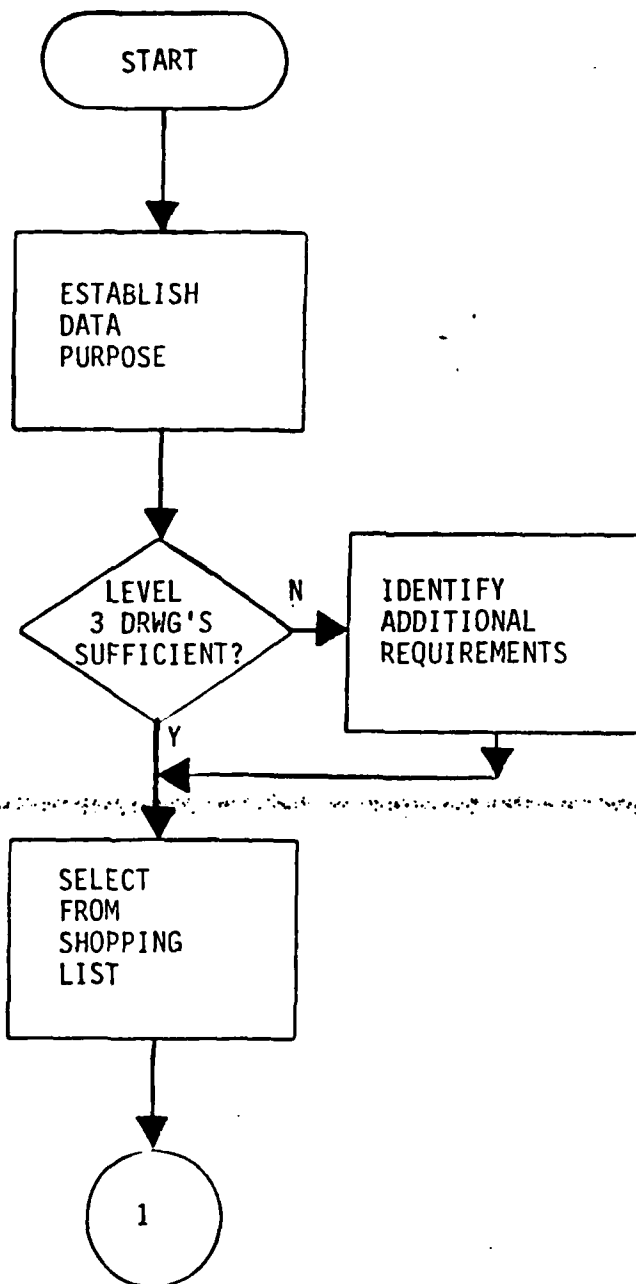


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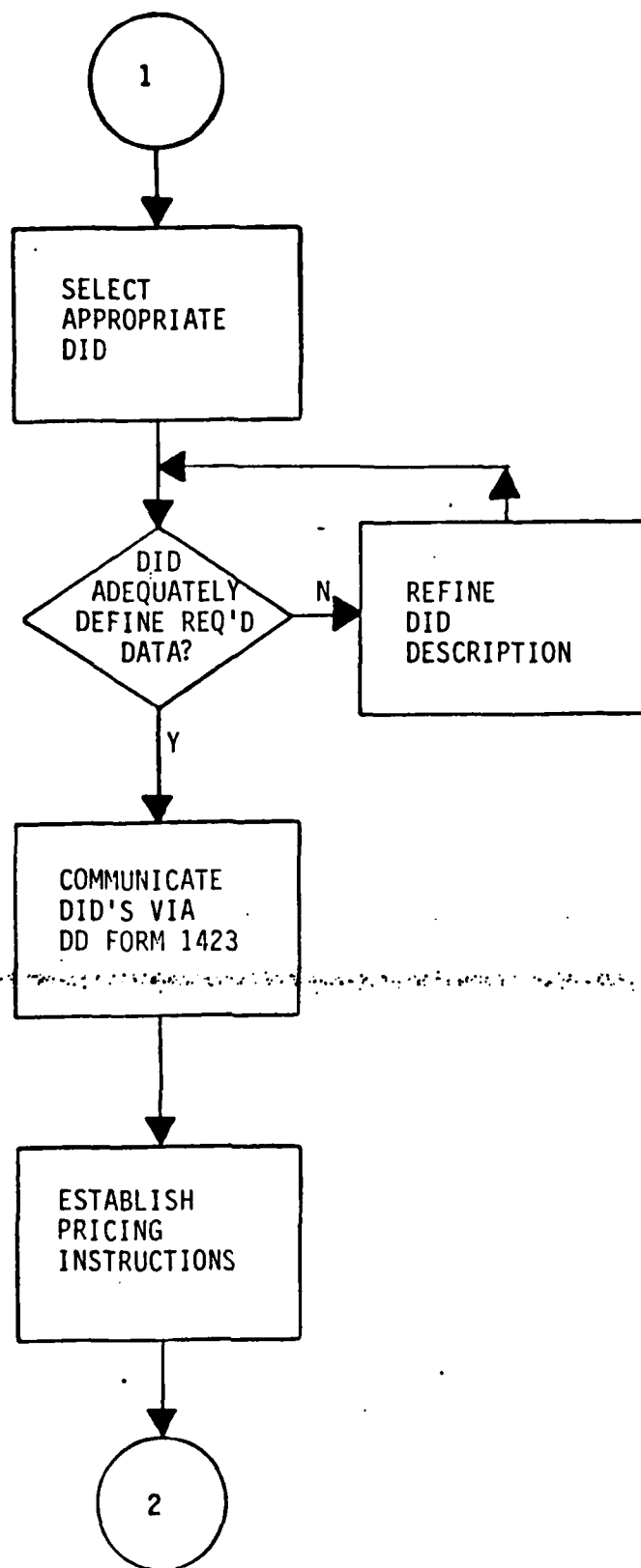
8.1 METHODOLOGY HANDBOOK



Initially, Air Force technical personnel establish the specific purpose for the data to be acquired. There are four purposes for acquisition or procurement data packages: 1) Competitive Acquisition of Identical Items; 2) Competitive Acquisition of Interchangeable Items; 3) Competitive Acquisition of Items from Selected Sources; 4) Noncompetitive (sole or directed source) Acquisition. The structure of the data required of a contractor depends on the planned use or purpose of the data. Although this methodology can be used for evaluating any set of acquisition data, it is designed to support the Competitive Acquisition of Identical Items (full design disclosure). The extent of the required system coverage must be established. These technical personnel then determine if the data is to include the entire system or only selected subsystems or components.

After identifying the system level of data to be acquired, these personnel must determine if a Level 3 Engineering Drawing Package as described within DOD-D-1000B is sufficient. If a Level 3 Drawing Package is not sufficient, then these personnel must identify if additional data is required. For example, electrical subsystems or components may require additional documentation if not separately tested during system production.

Having established the purpose and system level of the data to be acquired, the technical personnel then determine the types of documentation (data) required and either selecting these from the "shopping list" -- Attachment A, or from alternate sources. The technical personnel must categorize the types of documentation selected into one of the four following categories: 1) Drawings; 2) Specifications; 3) Plans; and 4) Reports. This categorization will assist other technical personnel in evaluating the contractor's proposed cost.

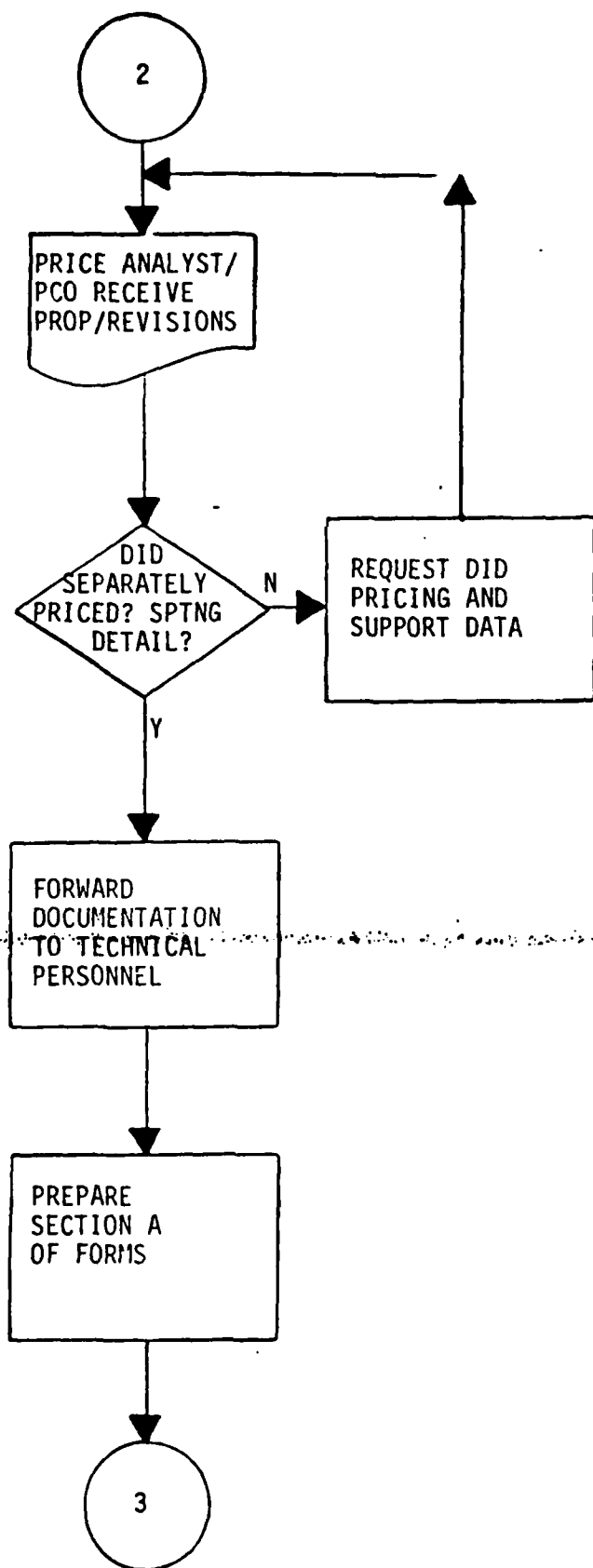


Upon selecting the types of documentation required, the technical personnel select the appropriate Data Item Description (DID) which allows the data to be acquired.

These personnel must apply their own judgment in determining if the DID adequately defines the required data or if the DID needs tailoring to refine the description or format of the required data. Notes should be made regarding the tailoring of DIDs because of the possible impact upon a contractor's proposed cost.

The PCO then communicates these DIDs to the contractor via DD Form 1423. This communication should include a request of the contractor to separately price each DID and to provide adequate cost supporting detail for each DID, whether prepared by the contractor or subcontractor.

The cost supporting detail requested should include, but not be limited to, the following: ~~Group Code assignment, size and~~ number of drawings, number of document pages - new and revisions, illustrations, level of manufacturing technology, current level of data, skill level(s) and associated hourly rate of data preparer(s), per page reproduction cost, complexity (and rationale) of document (i.e., simple, average, complex), detail of data preparation effort, and document format. (See Attachment B for skill levels for each of the four document categories.

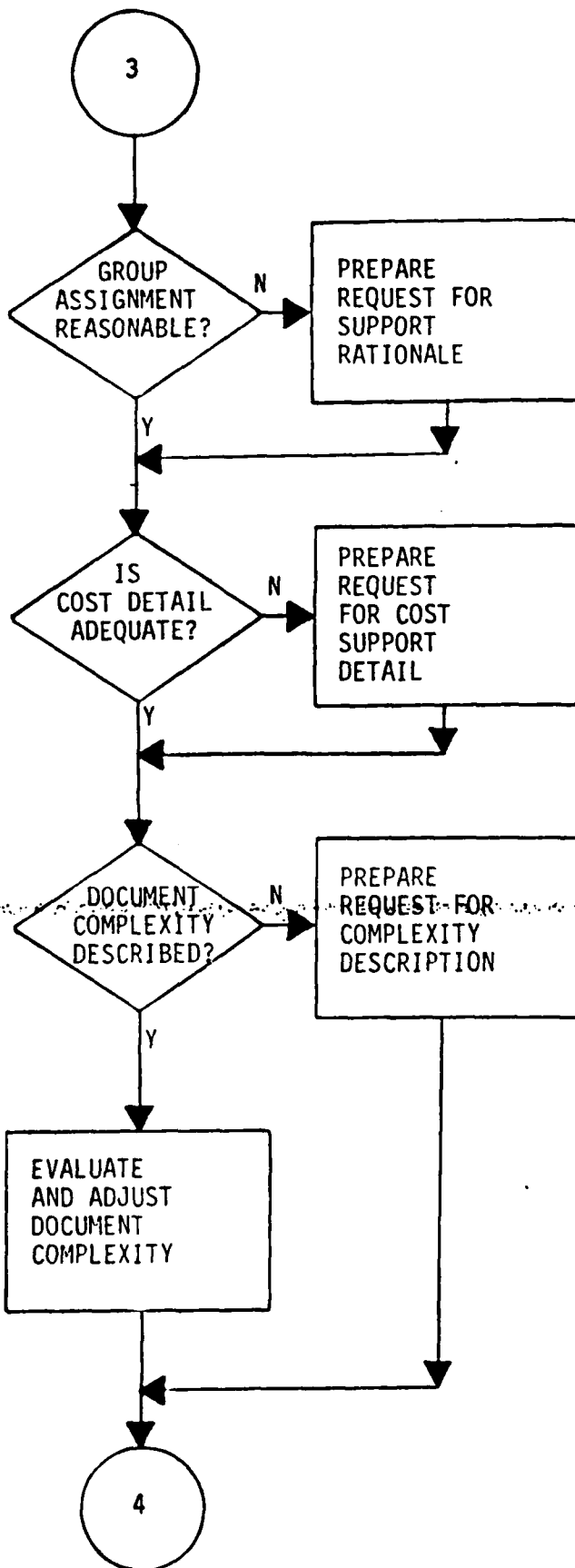


Upon receipt of the contractor's proposal, the PCO and the Price Analyst reviews the data portion to determine if each DID has been separately priced and if supporting detail regarding price establishment has been provided (the adequacy of supporting detail will be analyzed by technical personnel). If the contractor has not separately priced each DID nor provided cost supporting detail, then the PCO or Price Analyst must re-request such from the contractor.

If the contractor has separately priced each DID and provided cost supporting detail, then the PCO or Price Analyst forwards the data portion of the proposal, one set of forms and attachments for each DID, and technical notes from the data requirement development process to the technical personnel for an in-depth analysis. (The forms provided to the technical personnel will summarize the technical analysis and provide the PCO and Price Analyst the details to apply labor rates and overhead burdens in establishing a negotiating position. These forms can be found in Attachment G.)

Upon receipt of the forms and data portion of the proposal, the technical personnel will prepare Section A of each DID form. The type of documentation to be submitted by the contractor will be categorized in the notes provided by those technical personnel who established the data requirement.

The attachment to the forms will be one of four types based upon the type of documentation expected to be submitted by the contractor. These types are described on page 1. The Price Analyst will supply the respective DID form attachment.

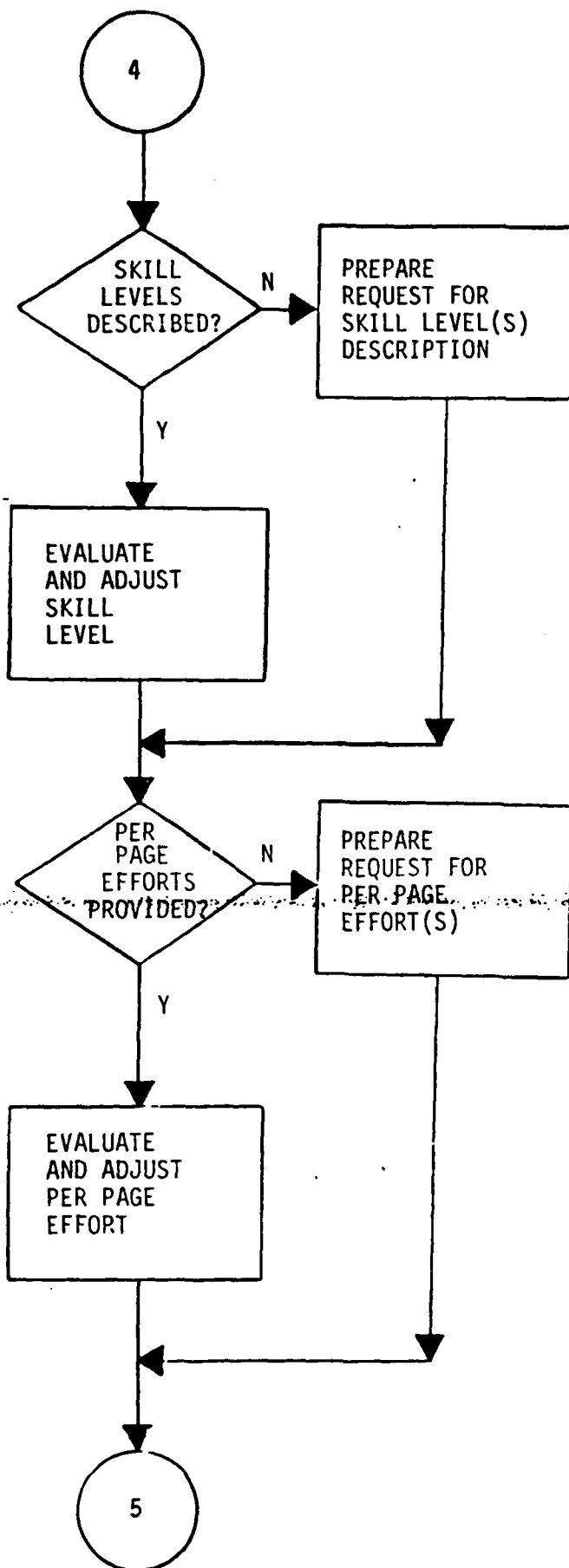


It is mandatory that the contractor assign the proper Group Coding to each data item listed on the DD Form 1423 (the four Price Groups are described in Attachment D). The technical personnel must initially review the contractor's Group Code assignment in order to better analyze the preparatory efforts and associated costs to fulfill each DID. Factors to be considered in reviewing the code assignment include DID tailoring and level of data as described on pages 2 and 3. It is, therefore, critical that the contractor provide the assignment rationale. If the rationale is not provided, then the technical personnel must prepare a request of the contractor. (The comparative, baseline values contained in the "data listing" attachments refer to only the first three groups. The government requirement for Group IV data is minimal.)

Next, the technical personnel conduct a preliminary review of the cost supporting detail for adequacy and completeness. This review determines if the contractor provided the types of detail described on page 3. If details are inadequate or missing, then the technical personnel must prepare a request of the contractor.

The technical personnel must then determine if the contractor provided a description of the complexity of the individual documents to be submitted. If this description has not been provided, they must prepare a request of the contractor.

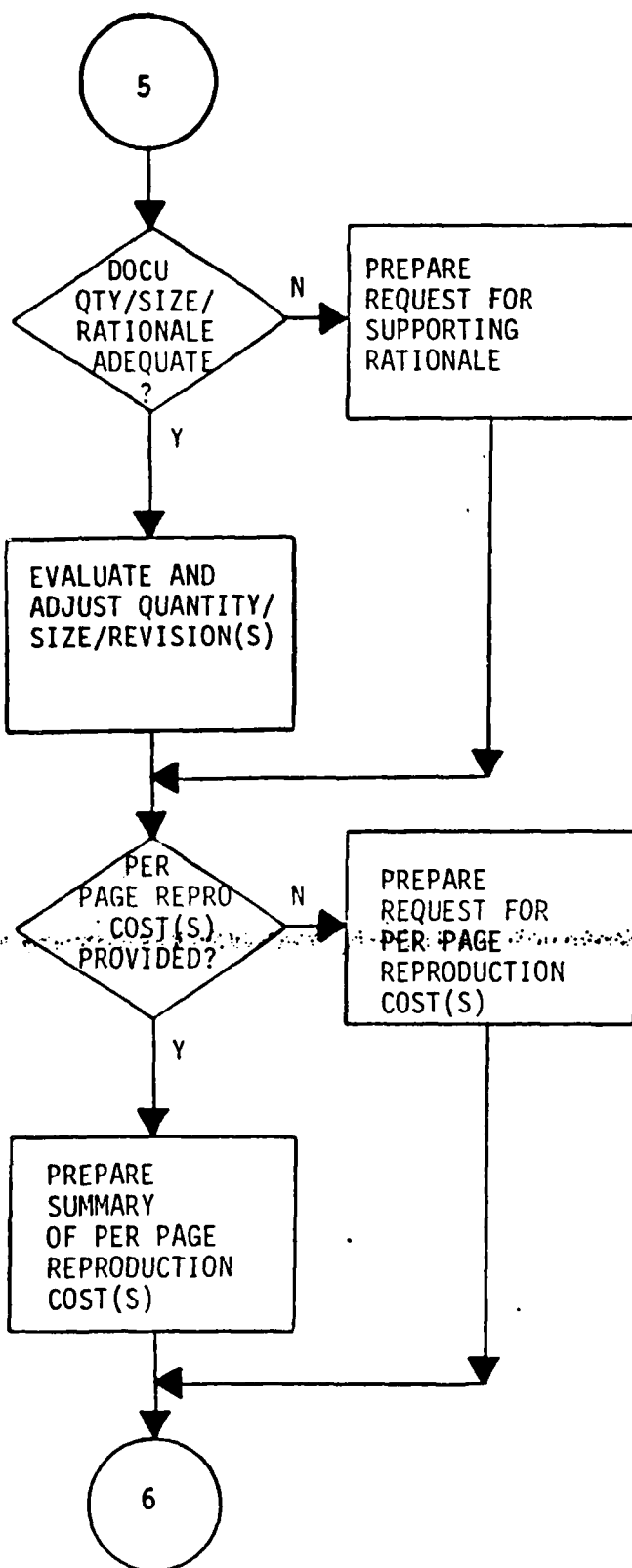
The categories of complexity are: 1) simple; 2) average; and 3) complex. System level of technology design characteristics, number of components, and over-and-above data can affect the complexity of document preparation efforts. Assignment to one of these categories by the technical personnel is based on their own judgment and the supporting detail provided by the contractor. Adjustments to or acceptance of the contractor's individual document complexity levels should be noted on the back of the attachments to the forms.



Each labor category or skill level to prepare the data needs to be described by the contractor. If no breakdown by skill level is provided by the contractor, the technical personnel must prepare a request of the contractor. The breakdown of skill level should be requested to correspond to the listing of labor skills by document category as listed in Attachment B. The title of the skill levels proposed by the contractor may not exactly match those in Attachment B. The technical personnel evaluate, based on the Group Code assignment the appropriateness of the proposed skill levels. Factors affecting skill level include system complexity and level of technology, level of drawings, and over-and-above data requirements. Adjustments to or acceptance of the contractor's proposed skill levels of document preparers should be listed on the back of the attachments to the forms provided by the Price Analyst. (Titles of the skill levels should be those as proposed by the contractor.)

Having identified and listed the required skill levels of the document preparers, the technical personnel determine if the per page preparation effort (hours) is provided or obtainable (i.e., dividing total hours by number of pages). If the per page effort by skill level is not provided or obtainable, then they must prepare a request from the contractor. Per page preparation efforts are provided in the "data listing" as follows: Attachment E - Engineering Drawings; Attachment F - Specifications; Attachment G - Plans; Attachment H - Reports.

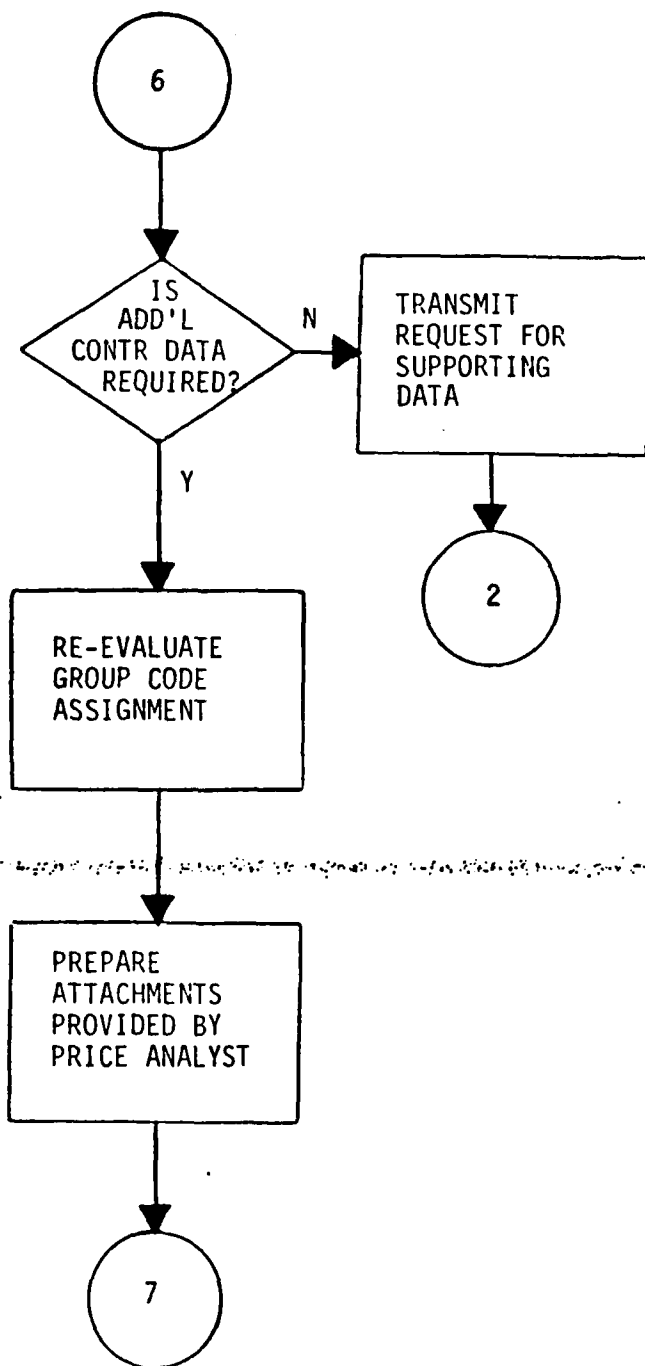
Based on the document type, group assignment, skill level, and complexity level, the technical personnel can refer to the respective attachment and extract the number of hours to prepare a single page of a document. A comparison can then be made to the contractor's proposed per page preparation hours. Adjustments to or acceptance of the contractor's per page preparation effort by skill level should be listed on the back of the attachments to the forms provided by the Price Analyst.



The technical personnel then review the contractor's rationale for the quantity (number of pages and drawings), sizes (drawings), and number of revisions of the documents to be submitted. If the contractor's rationale is inadequate or missing, they must prepare a request of the contractor. The primary factor affecting the quantity of pages and drawings will be the complexity of the system. Adjustments to or acceptance of the contractor's quantities, sizes, and revisions of the documents should be listed on the back of the attachments to the forms provided by the Price Analyst.

Per page reproduction costs for any of the documents must be provided by the contractor. The costs may represent merely photocopying existing documents or preparing a 35mm microfilm reproduction. In either case, if the contractor proposes reproduction costs, then a per page cost must be provided or requested by the technical personnel. Most contractors have another contractor prepare 35mm microfilms and quote the cost in dollars, not hours. ~~Due to contractor geographical and equipment differences, variations for reproduction costs exist and, hence, no cost standards are provided.~~

Reprocurement data is generally Type I Silver Halide microfilm, Class 1 Camera microfilm (negative type) clear-line image. This type and class are very expensive and must be evaluated seriously and judiciously by the technical personnel and Price Analyst. After evaluating the reproduction costs, the technical personnel should list on the back of the DID attachment the number of pages and proposed per page cost for reproduction.

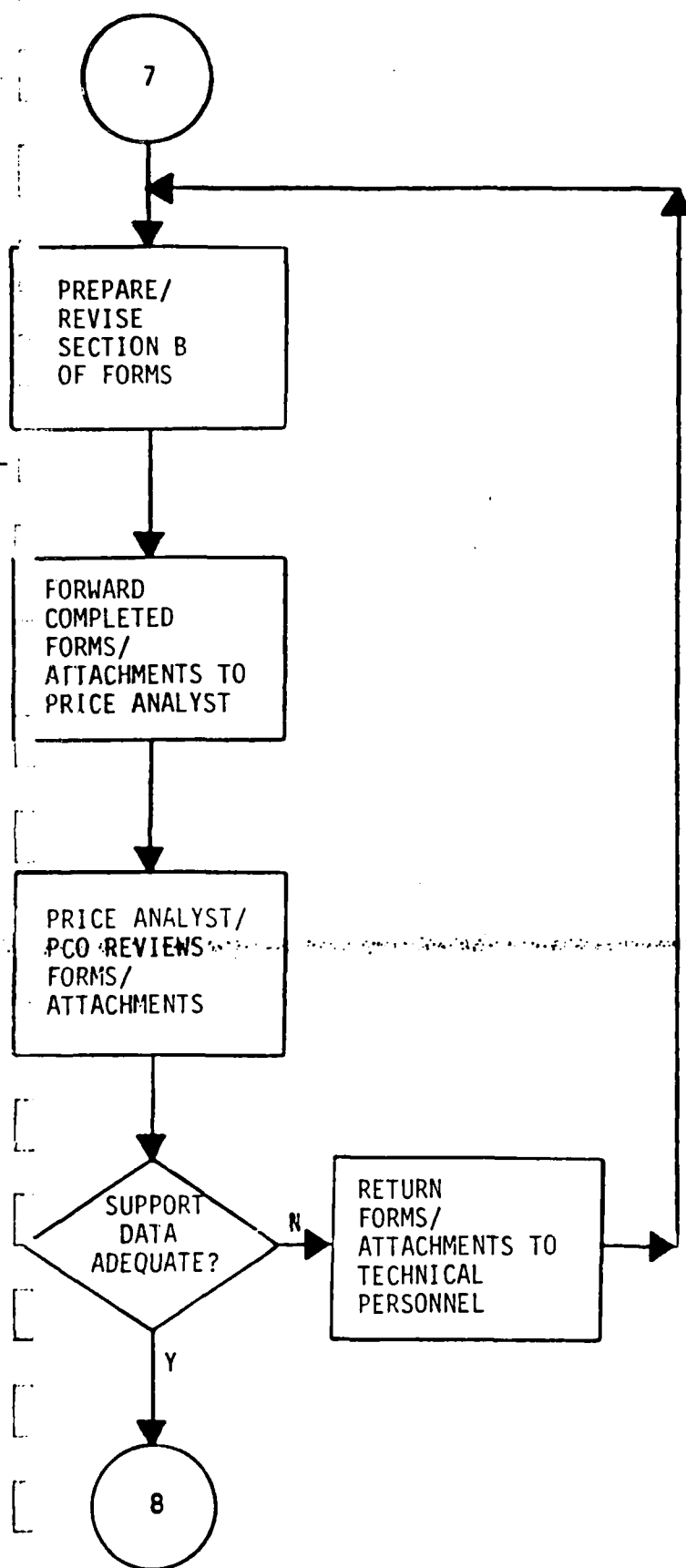


Throughout this methodology the technical personnel have been preparing requests of the contractor for additional supporting rationale. Before transmitting these requests to the contractor, they should determine whether or not any additional data is required.

On page 4 of this methodology, the technical personnel evaluated the reasonableness of the contractor's group code assignment. This evaluation occurred prior to analyzing the detail data cost elements. Now that they have analyzed the contractor's supporting rationale for preparing the individual DIDs, these technical personnel must re-evaluate the contractor's group code assignment. The factors (described on page 4) affecting the contractor's group code assignment must be considered.

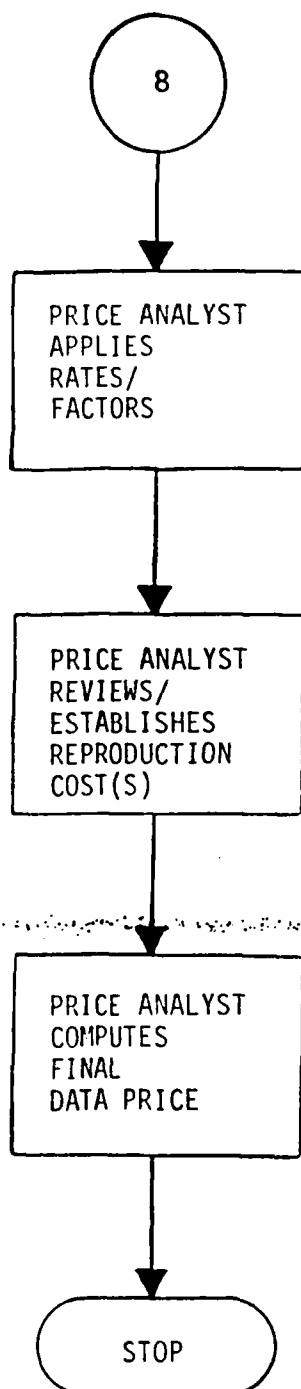
The technical personnel have been making notes on the back of the respective attachments to the forms provided by the Price Analyst indicating the acceptance of or description of adjustments to the elements affecting the proposed cost of an individual DID. Included in these notes are the Group Code assignment, document complexity level, number of document pages, drawing sizes and quantity for engineering drawings, number of revisions, and per page document preparation effort by skill level. The technical personnel now prepare the front side of the attachments, indicating the contractor proposed elements and the technical personnel recommended elements, for submittal to the Price Analyst.

The specific type of the document will be the title of the DID and indicated in the space provided. The total proposed and recommended hours will be transferred by the technical personnel from page 2 to page 1 of the attachments. If the technical personnel made any adjustments to the contractor proposed hours, then these adjustments should be briefly described in the notes section and continued on the back side if necessary. These notes will assist the PCO and Price Analyst in negotiations.



The technical personnel now prepare Section B of each DID form. The information to be provided in this section will be transferred from the attachments. After fully preparing the forms and attachments, they forward the forms, attachments, and all other data provided by the PCO, Price Analyst, and the contractor to the Price Analyst.

The PCO and Price Analyst reviews the information provided on the forms and attachments for completeness and adequacy for supporting the recommended positions. This information is the basis for the government negotiating position and must be adequately detailed to support such a position. If the information is not adequate, then the PCO and Price Analyst must return the forms and attachments to the technical personnel for revision or further details.



If the data provided by the technical personnel is adequate, then the Price Analyst can apply the respective labor rates and burdens to each of the skill levels proposed by the contractor. The labor rates and burdens applied by the Price Analyst can reflect different pay scales at various locations for the same type work, prime versus subcontractor data preparation, and variations due to business practices or competitive pressures.

Before computing a final price, the Price Analyst reviews and establishes, in conjunction with the technical personnel, a per page cost for reproduction for each DID requiring reproduction. This per page cost should reflect the type of reproduction medium and the economic pressures affecting the cost (i.e., inflationary factors, geographical location, etc.). Upon establishing a per page cost for reproduction, the Price Analyst multiplies this cost by the number of pages in determining the DID reproduction cost.

The Price Analyst then completes the computation of each DID price by applying overhead and profit factors to the labor and reproduction costs. Summing the individual DID prices results in the final establishment of a recommended price for the Acquisition Data Package. The total derived price for the Acquisition Data Package can then be compared to the total proposed price to determine the reasonableness of the proposal.

ATTACHMENT A
SHOPPING LIST

- Engineering Drawings and Associated Lists (various sizes)
- Material Specifications
- Process Specifications
- Test Specifications
- NC Tapes
- Calibration Information
- Test Program Sets
- Packaging Data
- Company Specifications
- Company Standards
- Acceptance Test Procedures
- Integrated Circuit Data
- Test Requirements Documents
- Integrated Circuit Test Requirements
- System Specifications
- Interface Control Specifications
- Inventory Item Specifications
- Configuration Item Product Fabrication Specifications
- Configuration Item Product Function Specifications
- Drawing Trees

ATTACHMENT B

SKILL LEVELS

Document Type

Skill Levels

Engineering Drawings

Supervision
Design
Checking
Drafting
Control
Reproduction

Specifications, Plans,
Reports

Engineer
Engineer Assistant
Clerical
Art/Drafting
Production

ATTACHMENT C
FORMS AND ATTACHMENTS

SECTION A

Contractor:

RFP Number:

Evaluator Name and Office Symbol:

DID Number:

Type of Document: (Circle One) Drawings
 Specifications
 Plans
 Reports

SECTION B¹

1. Hours (by skill level²) Contractor Proposed Recommended

2. If reproduction costs are proposed by contractor, list type, number of pages (or drawing size), and per page reproduction cost. (Per page reproduction cost "recommended" should be jointly provided by price analyst and technical personnel.)

Type
Number of Pages
Per page cost
Total cost

3. Notes

¹Provide details of DID analysis on attached pages.

²Skill level titles should be that as proposed by contractor.

ATTACHMENT C (cont'd)

ATTACHMENT 1

ENGINEERING DRAWINGS

Drawing Size		<u>Contractor Proposed</u>			<u>Recommended</u>		
		<u>Qty</u>	<u>Group</u>	<u>Complexity</u>	<u>Qty</u>	<u>Group</u>	<u>Complexity</u>
	A						
	P						
	C						
	D						
	E						
	F						
	G						
	H						
	J						
	K						
<u>Skill Level</u> ¹		<u>Total Proposed Hours</u> ²			<u>Total Recommended Hours</u> ²		
Supervision							
Design							
Checking							
Drafting							
Control							
Reproduction							

¹Skill level titles should be that as proposed by contractor.

²See page 2.

Notes:

ATTACHMENT C (cont'd)

ENGINEERING DRAWINGS - ATTACHMENT 2

SINGLE PAGE PREPARATION HOURS

	Supervision		Design		Checking		Drafting		Control		Reproduction		Quantity		Total	
	Prop	Rec	Prop	Rec	Prop	Rec	Prop	Rec	Prop	Rec	Prop	Rec	Prop	Rec	Prop	Rec

A B C D E F G H J

Total
Hours

x
Total Quantity of A-K Size
Drawings to be Submitted

=
Total Hours by Skill Level
(To be transferred to page 1 of Attachment)

ATTACHMENT C (cont'd)

ATTACHMENT 1

SPECIFICATIONS

(Type _____)

Contractor Proposed

Recommended

No. of
Pages Group Complexity

No. of
Pages Group Complexity

Skill Level¹

Total Proposed Hours²

Total Recommended Hours²

Engineer

Engineer Ass't

Clerical

Art/Drafting

Production

¹Skill level titles should be that as proposed by contractor.

²See page 2.

Notes:

ATTACHMENT C (cont'd)

ATTACHMENT 2

SPECIFICATIONS

Contractor Proposed

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

Recommended Position

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

ATTACHMENT C (cont'd)

ATTACHMENT 1

PLANS

(Type _____)

Contractor Proposed

Recommended

No. of
Pages Group Complexity

No. of
Pages Group Complexity

Skill Level¹

Total Proposed Hours²

Total Recommended Hours²

Engineer

Engineer Ass't

Clerical

Art/Drafting

Production

¹Skill level titles should be that as proposed by contractor.

²See page 2.

Notes:

ATTACHMENT C (cont'd)

ATTACHMENT 2

PLANS

Contractor Proposed

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

Recommended Position

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

ATTACHMENT C (cont'd)

ATTACHMENT 1

REPORTS

(Type _____)

<u>Contractor Proposed</u>			<u>Recommended</u>		
<u>No. of Pages</u>	<u>Group</u>	<u>Complexity</u>	<u>No. of Pages</u>	<u>Group</u>	<u>Complexity</u>

Skill Level¹

Total Proposed Hours²

Total Recommended Hours²

Engineer

Engineer Ass't

Clerical

Art/Drafting

Production

¹Skill level titles should be that as proposed by contractor.

²See page 2.

Notes:

ATTACHMENT C (cont'd)

ATTACHMENT 2

REPORTS

Contractor Proposed

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

Recommended Position

Single Page Preparation Hours x Number of Pages = Total Hours

Engineer
Engineer Ass't
Clerical
Art/Drafting
Production

ATTACHMENT D

PRICE GROUPS

Group I. Group I contractor effort covers that data which the contractor has to prepare solely to satisfy the government requirement. These type data are not essential to the contractor's performance of the primary contracted effort. Government pays all identifiable costs plus G&A, Overhead and Profit for this group. This group is the most costly to the government. An example of Group I data is Technical Manuals prepared for government use only. (Note: Source material for Technical Manuals are generally Engineering Drawings, the cost of which are priced independently from the selling price for the Technical Manuals.)

Group II. Group II covers that data which is essential to the performance of the primary contracted effort but additional "over-and-above" contractor effort is required to conform to government stated requirements such as special formats, number of copies, etc. Government pays only for that part of the task required in preparing final delivered product plus G&A, Overhead and Profit. Much of the data procured by the government falls in this group. An example would be engineering drawings. The estimated selling price includes the contractor effort expended after engineering and manufacturing information is developed. This price should not include research, design, layout times, etc., and exclude all efforts from other prepared data which serve as the basis for ~~developing design, manufacture, production or test of any end item~~ or component that are to be delivered under the contract.

Group III. Group III covers that data which the contractor must develop for his internal use and which requires no substantial change to conform to government requirements with regard to depth of content, format, frequency of submittal, preparation, and quality of data. Government pays only "over-and-above" costs such as reproducing, handling and delivering data plus G&A, overhead and profit for this group. An example would be engineering drawings in company format and drawn to company standards as used in the manufacturer's normal plant functions.

Group IV. Group IV contractor effort covers that data which the contractor has developed as part of his commercial business. The government requirement for this data is minimal and the cost is also comparatively minimal, therefore, the data item is coded "No Charge." The use of this group by contractors during weapon systems acquisitions is generally not condoned since it has no application by definition. An example would be a brochure or brief manual developed by the contractor for commercial application.

ATTACHMENT E

ENGINEERING DRAWINGS

TOTAL AVERAGE MANHOURS FOR PREPARATION OF INITIAL DRAWINGS

GROUP I

Drawing Sizes		Simple	Average	Complex
<u>FLAT</u>				
"A"	- 8 1/2" X 11" (.65 sq ft)	1.2	2.3	4.4
"B"	- 11" X 17" (1.30 sq ft)	2.9	4.9	8.8
"C"	- 17" X 22" (2.60 sq ft)	6.2	9.9	17.6
"D"	- 22" X 34" (5.20 sq ft)	10.7	21.0	35.6
"E"	- 34" X 44" (10.40 sq ft)	21.6	41.7	71.2
"F"	- 28" X 40" (9.33 sq ft)	19.6	37.3	63.2
<u>ROLL</u>				
"G"	Min - 11" X 42"	8.1	15.3	25.8
	Max - 11" X 144"	28.1	53.0	89.8
"H"	Min - 28" X 48"	23.5	44.8	76.2
	Max - 28" X 144"	71.2	135.1	228.5
"J"	Min - 34" X 48"	28.9	54.7	92.5
	Max - 34" X 144"	86.5	163.9	277.4
"K"	Min - 40" X 48"	34.0	64.8	108.8
	Max - 49" X 144"	101.7	192.8	326.4

ENGINEERING DRAWINGS

TOTAL AVERAGE MANHOURS FOR PREPARATION OF INITIAL DRAWINGS

GROUP II

Drawing Sizes		Simple	Average	Complex
<u>FLAT</u>				
"A" - 8 1/2" X 11"	(.65 sq ft)	.5	1.3	2.2
"B" - 11" X 17"	(1.30 sq ft)	1.2	2.6	4.6
"C" - 17" X 22"	(2.60 sq ft)	3.1	4.9	8.4
"D" - 22" X 34"	(5.20 sq ft)	9.8	12.6	18.1
"E" - 34" X 44"	(10.40 sq ft)	12.6	22.2	36.4
"F" - 28" X 40"	(9.33 sq ft)	11.8	20.3	32.6
<u>ROLL</u>				
"G" - Min - 11" X 42"	(3.8 sq ft)	4.8	8.4	13.3
Max - 11" X 144"	(13.2 sq ft)	16.7	28.7	46.4
"H" - Min - 38" X 48"	(11.2 sq ft)	13.9	24.2	39.3
Max - 28" X 144"	(33.6 sq ft)	42.5	73.1	118.0
"J" - Min - 34" X 48"	(13.6 sq ft)	17.2	29.6	47.7
Max - 34" X 144"	(40.8 sq ft)	51.5	88.7	143.2
"K" - Min - 40" X 48"	(16.0 sq ft)	20.3	34.9	56.2
Max - 40" X 144"	(48.0 sq ft)	60.5	104.3	168.4

ENGINEERING DRAWINGS

TOTAL AVERAGE MANHOURS FOR PREPARATION OF INITIAL DRAWINGS

GROUP III

<u>Drawing Sizes</u>		<u>Simple</u>	<u>Average</u>	<u>Complex</u>
<u>FLAT</u>				
"A" - 8 1/2" X 11"	(.65 sq ft)	.3	.4	.5
"B" - 11" X 17"	(1.30 sq ft)	.6	.7	.9
"C" - 17" X 22"	(2.60 sq ft)	1.5	1.6	1.8
"D" - 22" X 34"	(5.20 sq ft)	2.5	2.8	3.2
"E" - 34" X 44"	(10.40 sq ft)	4.8	5.4	6.2
"F" - 28" X 40"	(9.33 sq ft)	4.9	5.4	6.1
<u>ROLL</u>				
"G" - Min - 11" X 42"	(3.8 sq ft)	2.2	2.3	2.6
Max - 11" X 144"	(13.2 sq ft)	7.0	7.8	8.9
"H" - Min - 28" X 48"	(11.2 sq ft)	5.7	6.3	7.3
Max - 28" X 144"	(33.6 sq ft)	17.8	19.8	22.9
"J" - Min - 34" X 48"	(13.6 sq ft)	7.2	8.0	9.2
Max - 34" X 144"	(40.8 sq ft)	21.6	24.0	27.6
"K" - Min - 40" X 48"	(16.0 sq ft)	8.5	9.5	10.9
Max - 40" X 144"	(48.0 sq ft)	25.3	28.3	32.6

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "A" DRAWINGS

8 1/2" X 11" (.65 SQ FT) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	1.2	.01	.12	.14	.59	.07	.31
Average	2.3	.04	.22	.31	1.30	.15	.31
Complex	4.4	.08	.48	.62	2.59	.31	.31
Group II							
Simple	.5	.01	.05	.06	.28	.03	.31
Average	1.3	.01	.10	.15	.62	.07	.31
Complex	2.2	.02	.23	.30	1.2	.15	.31
Group III							
Simple	.3	.01	---	.01	---	.01	.31
Average	.4	.01	---	.04	---	.02	.31
Complex	.5	.02	---	.08	---	.04	.31

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "B" DRAWINGS

11" x 17" (1.30 sq ft) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	2.9	.10	.3	.3	1.5	.1	.6
Average	4.9	.10	.5	.6	2.8	.3	.6
Complex	8.8	.20	1.0	1.2	5.2	.6	.6
Group II							
Simple	1.2	.03	.06	.09	.3	.04	.6
Average	2.6	.05	.23	.27	1.3	.14	.6
Complex	4.6	.10	.48	.57	2.5	.29	.6
Group III							
Simple	.6	.01	---	.04	---	.02	.6
Average	.7	.02	---	.08	---	.04	.6
Complex	.9	.04	---	.2	---	.07	.6

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "C" DRAWINGS

17" x 22" (2.60 sq ft) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	6.2	.9	.5	.6	2.7	.3	1.2
Average	9.9	.2	1.1	1.2	5.5	.7	1.2
Complex	17.6	.4	2.0	2.4	10.4	1.2	1.2
Group II							
Simple	3.1	.1	.2	.3	1.2	.1	1.2
Average	4.9	.1	.4	.5	2.5	.2	1.2
Complex	8.4	.2	.8	1.0	4.7	.5	1.2
Group III							
Simple	1.5	.1	---	.1	---	.1	1.2
Average	1.6	.1	---	.2	---	.2	1.2
Complex	1.8	.1	---	.3	---	.2	1.2

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "D" DRAWINGS

22" x 34" (5.20 sq ft) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	10.7	.3	1.1	1.4	5.5	.3	2.1
Average	21.0	.6	2.4	2.9	11.8	1.2	2.1
Complex	35.6	1.0	4.2	5.2	21.0	2.1	2.1
Group II							
Simple	9.8	.2	1.0	1.2	4.8	.5	2.1
Average	12.6	.3	1.3	1.6	6.6	.7	2.1
Complex	18.1	.5	2.0	2.5	10.0	1.0	2.1
Group III							
Simple	2.5	.1	---	.2	----	.1	2.1
Average	2.8	.1	---	.4	----	.2	2.1
Complex	3.2	.1	---	.7	----	.3	2.1

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "E" DRAWINGS

34" x 44" (10.40 sq) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	21.6	.5	2.2	2.7	10.9	1.1	4.2
Average	41.7	1.1	4.7	5.8	23.5	2.4	4.2
Complex	71.2	2.0	8.4	10.4	42.0	4.2	4.2
Group II							
Simple	12.6	.3	1.0	1.3	5.3	.5	4.2
Average	22.2	.6	2.2	2.8	11.3	1.1	4.2
Complex	36.4	1.0	4.0	5.0	20.2	2.0	4.2
Group III							
Simple	4.8	.1	---	.4	----	.1	4.2
Average	5.4	.1	---	.8	----	.3	4.2
Complex	6.2	.1	---	1.4	----	.5	4.2

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "F" DRAWINGS

28" x 40" (9.33 sq ft) FLAT

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS	SUPERVISION	DESIGN	CHECKING	DRAFTING	CONTROL	REPRODUCTION
Group I							
Simple	19.6	.3	3.8	2.3	9.7	1.1	4.4
Average	37.3	.7	3.9	4.9	20.9	2.5	4.4
Complex	63.2	1.3	7.0	8.8	37.3	4.4	4.4
Group II							
Simple	11.8	.2	.9	1.1	4.7	.5	4.4
Average	20.3	.3	1.9	2.4	10.1	1.2	4.4
Complex	32.6	.6	3.4	4.2	17.9	2.1	4.4
Group III							
Simple	4.9	.1	---	.3	----	.1	4.4
Average	5.4	.1	---	.6	----	.3	4.4
Complex	6.1	.1	---	1.1	----	.5	4.4

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "G" DRAWINGS

11" x 42" to max of 11" x 144" (3.8 to 13.2 sq ft) ROLL

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS		SUPERVISION		DESIGN		CHECKING		DRAFTING		CONTROL		REPRODUCTION	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Group I														
Simple	8.1	28.1	.2	.5	.7	2.6	1.0	3.3	3.9	13.8	.5	1.6	1.8	6.3
Average	15.3	53.0	.4	1.0	1.6	5.5	2.0	7.1	8.5	29.6	1.0	3.5	1.8	6.3
Complex	25.8	89.8	.6	1.8	2.8	9.9	3.6	12.6	15.2	52.9	1.8	6.3	1.8	6.3
Group II														
Simple	4.8	16.7	.1	.2	.6	1.2	.5	1.6	1.9	6.6	.2	.8	1.8	6.3
Average	8.4	28.7	.2	.5	.8	2.6	1.0	3.4	4.1	14.2	.5	1.7	1.8	6.3
Complex	13.3	46.4	.3	.9	1.3	4.8	1.7	6.0	7.3	25.4	.9	3.0	1.8	6.3
Group III														
Simple	2.2	7.0	.1	.1	---	---	.2	.4	---	---	.1	.2	1.8	6.3
Average	2.3	7.8	.1	.1	---	---	.3	.9	---	---	.1	.5	1.8	6.3
Complex	2.6	8.9	.1	.2	---	---	.5	1.6	---	---	.2	.8	1.8	6.3

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "H" DRAWINGS

28" x 48" to max of 28" x 144" (11.2 to 33.6) ROLL

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS		SUPERVISION		DESIGN		CHECKING		DRAFTING		CONTROL		REPRODUCTION	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Group I														
Simple	23.5	71.2	.4	1.2	1.9	6.5	2.5	8.3	12.3	35.0	1.3	4.2	5.1	16.0
Average	44.8	135.1	.8	2.6	4.1	14.1	5.4	17.9	26.5	75.5	2.9	9.0	5.1	16.0
Complex	76.2	228.5	1.5	4.6	7.4	25.1	9.7	32.0	47.4	134.8	5.1	16.0	5.1	16.0
Group II														
Simple	13.9	42.5	.2	.6	.9	3.1	1.2	4.0	5.9	16.8	.6	2.0	5.1	16.0
Average	24.2	73.1	.4	1.2	2.0	6.8	2.6	8.6	12.7	36.2	1.4	4.3	5.1	16.0
Complex	39.3	118.0	.7	2.2	3.6	12.0	4.7	15.4	22.8	64.7	2.4	7.7	5.1	16.0
Group III														
Simple	5.7	17.8	.1	.2	---	---	.3	1.1	---	---	.2	.5	5.1	16.0
Average	6.3	19.8	.1	.3	---	---	.7	2.3	---	---	.4	1.2	5.1	16.0
Complex	7.3	22.9	.2	.6	---	---	1.3	4.2	---	---	.7	2.1	5.1	16.0

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "J" DRAWINGS

34" x 48" to max of 34" x 144" (13.6 to 40.8 sq ft) ROLL

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS		SUPERVISION		DESIGN		CHECKING		DRAFTING		CONTROL		REPRODUCTION	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Group I														
Simple	28.9	86.5	.5	1.4	2.7	8.0	3.3	10.1	14.2	42.6	1.7	5.0	6.5	19.4
Average	54.7	163.9	1.1	3.1	5.7	17.1	7.2	21.7	30.6	91.7	3.6	10.9	6.5	19.4
Complex	92.5	277.4	1.9	5.5	10.2	30.6	12.8	38.8	54.6	163.7	6.5	19.4	6.5	19.4
Group II														
Simple	17.2	51.5	.2	.7	1.3	3.8	1.6	4.8	6.8	20.4	.8	2.4	6.5	19.4
Average	29.6	83.7	.5	1.5	2.7	8.2	3.5	10.4	14.7	44.0	1.7	5.2	6.5	19.4
Complex	47.7	143.2	.9	2.6	4.9	14.7	6.1	18.6	26.2	78.6	3.1	9.3	6.5	19.4
Group III														
Simple	7.2	21.6	.1	.2	---	---	.4	1.3	---	---	.2	.7	6.5	19.4
Average	8.0	24.0	.1	.4	---	---	.9	2.8	---	---	.5	1.4	6.5	19.4
Complex	9.2	27.6	.2	.7	---	---	1.7	5.0	---	---	.8	2.5	6.5	19.4

ENGINEERING DRAWINGS

MANHOUR AVERAGES FOR PREPARATION OF SIZE "K" DRAWINGS

40" x 48" to max of 40" x 144" (16.0 sq ft) ROLL

GROUPS OF PREPARATION EFFORT	TOTAL MANHOURS		SUPERVISION		DESIGN		CHECKING		DRAFTING		CONTROL		REPRODUCTION	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Group I														
Simple	34.0	101.7	.6	1.7	3.1	9.3	4.0	11.9	16.7	50.1	2.0	5.9	7.6	22.8
Average	64.3	192.8	1.2	3.6	6.7	20.1	8.5	25.6	36.0	107.9	4.3	12.8	7.6	22.8
Complex	108.8	326.4	2.2	6.5	12.0	35.9	15.2	45.8	64.2	192.6	7.6	22.8	7.6	22.8
Group II														
Simple	20.3	60.6	.3	.8	1.5	4.5	1.9	5.7	8.0	24.0	1.0	2.8	7.6	22.8
Average	34.9	104.3	.6	1.7	3.2	9.6	4.1	12.3	17.3	51.8	2.1	6.1	7.6	22.8
Complex	56.2	168.4	1.1	3.1	5.8	17.2	7.3	22.0	30.8	92.4	3.6	10.9	7.6	22.8
Group III														
Simple	8.5	25.3	.1	.2	---	---	.5	1.5	---	---	.3	.8	7.6	22.8
Average	9.5	28.3	.2	.5	---	---	1.1	3.3	---	---	.6	1.7	7.6	22.8
Complex	10.9	32.6	.3	.8	---	---	2.0	6.0	---	---	1.0	3.0	7.6	22.8

ATTACHMENT F

SPECIFICATIONS

This Attachment contains average manhour information for the preparation of specifications. Like other types of data, the three major groups of simple, average, and complex, are utilized in determining data price estimates for specifications.

Specifications are expensive data items due to their built-in "Christmas tree" effect, and are considered basic source documentation.

Specifications are generally prepared in compliance with a Government statement of requirements and would be coded Price Group I. Specifications prepared by the contractor as basic source documentation for his own use in manufacturing hardware are amended to satisfy the content and format requirements stated in the contract and are coded Price Group II by the contractor. "As is," existing contractor-prepared specification, involve only reproduction and delivery charges and the contractor will code this type data as Price Group III.

Many specifications furnished the Government to satisfy "configuration management" data requirements are those which the contractor had to prepare for his own in-house use. The bulk of this preparation effort should be chargeable to engineering or design time and not to documentation. Accordingly, Price Groups II and III are used. In some instances, contractors use "industry standard" specifications applicable to many contractual efforts. Delivery of such specifications to the Government are generally coded Price Group III.

SPECIFICATIONS

ALL LEVELS OF INDENTURE

AVERAGE MANHOURS PER PAGE BY TASK ELEMENTS

Type of Effort	GROUP #1			GROUP #2			GROUP #3		
	Simple	Average	Complex	Simple	Average	Complex	Simple	Average	Complex
Engineer	2.9	6.3	11.2	1.4	3.0	5.4	.2	.8	1.5
Engr Asst	.6	1.3	2.3	.3	.6	1.1	.1	.2	.3
Clerical	.2	.4	.8	.1	.2	.4	.1	.1	.1
Art/Drafting	.2	.5	.9	.1	.2	.4	.1	.1	.1
Production	.8	.8	.8	.8	.8	.8	.8	.8	.8
Total	4.7	9.3	16.0	2.7	4.8	8.1	1.3	2.0	2.8

NOTES:

- Page Size: 8" x 10 1/2" or 8 1/2" x 11"
- Revision of Specifications amount up to 45% of above Manhours

SPECIFICATIONS

ALL LEVELS OF INDENTURE

TOTAL AVERAGE MANHOURS

NUMBER OF PAGES	1	5	10	15	20	25	30	35	40	45	50
I											
Simple	4.7	23.5	47.0	70.5	94.0	117.5	141.0	164.5	188.0	211.5	235.0
Average	9.3	46.5	93.0	139.5	186.0	232.5	279.0	279.0	372.0	418.5	465.0
Complex	16.0	80.0	160.0	240.0	320.0	400.0	480.0	560.0	640.0	720.0	800.0
II											
Simple	2.7	13.5	27.0	40.5	54.0	67.5	81.0	94.5	108.0	121.5	135.0
Average	4.8	24.0	48.0	72.0	96.0	120.0	144.0	168.0	192.0	216.0	240.0
Complex	8.1	40.5	81.0	121.5	162.0	202.5	243.0	283.5	324.0	364.5	405.0
III											
Simple	1.3	6.5	13.0	19.5	26.0	32.5	39.0	45.5	52.0	58.5	65.0
Average	2.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
Complex	2.8	14.0	28.0	42.0	56.0	70.0	84.0	98.0	112.0	126.0	140.0

NOTES: A. PAGE SIZE: 8" x 10 1/2" or 8 1/2" x 11"

B. REVISION OF SPECIFICATIONS AMOUNT UP TO 45% OF ABOVE MANHOURS

ATTACHMENT G

PLANS

This Attachment contains average manhour information for the preparation of plans.

Manhour information for "plans" are less specific than for engineering drawings, for instance. This category is more generalized and can be used for the evaluation of such things as configuration management or control plans, reliability demonstration plans, test plans, subsystem plans, safety engineering plans, production support plans, quality assurance program plans, manufacturing plans, other types of plans as well as various types of studies. Like other types of data, the three major groups of pricing effort are utilized in determining price estimates for plans.

The Price Group effort code applied by a contractor to a specific plan or study may be either Code I, II or III depending on whether or not he had to prepare the document for his own use. Relatively few plans are coded Group I. The majority of plans are coded either Group II or III. Studies generally follow the same pattern. A definition or feasibility study, for instance, may be the end product of a Research and Development contract and in these cases would be coded Group III with only reproduction and delivery charges being identified as data costs. The Price Group coding of plans and studies may be different for similar type data on the same contract.

PLANS

(Configuration Plans, Studies etc)

AVERAGE MANHOURS PER PAGE

By Task Element

Type of Effort	GROUP #1			GROUP #2			GROUP #3		
	Simple	Average	Complex	Simple	Average	Complex	Simple	Average	Complex
Engineer	2.1	4.5	8.0	1.0	2.1	3.8	.3	.6	1.0
Engr Asst	1.7	3.4	6.0	.8	1.6	2.9	.2	.4	.8
Clerical	.3	.6	1.0	.1	.3	.5	.1	.1	.1
Art/Drafting	.8	1.7	3.0	.2	.8	1.4	.1	.2	.4
Production	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total	6.2	11.5	19.3	3.4	6.1	9.9	2.0	2.6	3.6

PLANS

(Configuration Plans, Studies etc.)

TOTAL AVERAGE MANHOURS

NUMBER OF PAGES	1	5	10	15	20	25	30	35	40	45	50
I											
Simple	6.2	31.0	62.0	93.0	124.0	155.0	186.0	217.0	248.0	279.0	310.0
Average	11.5	57.5	115.0	172.5	230.0	287.5	345.0	402.5	460.0	517.5	575.0
Complex	19.3	96.5	193.0	289.5	386.0	482.5	579.0	675.5	772.0	868.5	965.0
II											
Simple	3.4	17.0	34.0	51.0	68.0	85.0	102.0	119.0	136.0	153.0	170.0
Average	6.1	30.5	61.0	91.5	122.0	152.5	183.0	213.5	244.0	274.5	305.0
Complex	9.9	49.5	99.0	148.5	198.0	247.5	297.0	346.5	396.0	445.5	495.0
III											
Simple	2.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0
Average	2.6	13.0	26.0	39.0	52.0	65.0	78.0	91.0	104.0	117.0	130.0
Complex	3.6	18.0	36.0	54.0	72.0	90.0	108.0	126.0	144.0	162.0	180.0

Page Size: 8" x 10-1/2" or 8-1/2" x 11"

ATTACHMENT H

REPORTS

This Attachment contains average manhour information for the preparation of reports.

Manhours concerning reports preparation are generalized. Reports can be a very expensive data, since this category covers the widest range of documentation acquired from the contractors. Examples of the various type reports are: Configuration Status Accounting Reports, Flight Test Reports, Engineering Data Analysis Reports, Production Analysis Reports, Safety Analysis Reports, Facility Design Criteria Reports, Evaluation Test Data Reports, Experimental Test Reports, Human Engineering Reports, Qualitative and Quantitative Personnel Requirements Reports, Electronic Interference Test Reports, Reliability and Maintainability Failure Reports, Daily, Weekly, Monthly, and Quarterly Progress Reports, Performance Characteristic Analysis Reports and various other technical major groups of pricing effort are utilized in determining price estimates for reports.

Many reports are prepared solely for government use and are coded Group I. Others are prepared for the contractor's and government's use, and are for the most part coded Group II. A small portion of reports are coded Group III. Certain types of test reports are very expensive because their preparation entails the use of special equipment to record test data and may also involve travel and per diem expenses to test sites, etc.; all costs of which are chargeable to the report.

Manhour information is included to evaluate data prices for such things as Test Procedures, and various types of Schedules and Special Instructions.

REPORT

(Status, Test Reports etc.)

AVERAGE MANHOURS PER PAGE BY TASK ELEMENTS

Type of Effort	GROUP #1			GROUP #2			GROUP #3		
	Simple	Average	Complex	Simple	Average	Complex	Simple	Average	Complex
Engineer	2.1	4.5	8.0	1.0	2.1	3.8	.3	.6	1.0
Engr Asst	.8	1.7	3.1	.4	.8	1.5	.1	.2	.4
Clerical	.3	.6	1.0	.1	.3	.5	.1	.1	.1
Art/Drafting	1.0	2.2	3.9	.5	1.1	1.9	.1	.3	.5
Production	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total	5.5	10.3	17.3	3.3	5.6	9.0	1.9	2.5	3.3

Page Size: 8" x 10 1/2" or 8 1/2" x 11"

REPORTS

STATUS, TEST REPORTS ETC.

TOTAL AVERAGE MANHOURS

NUMBER OF PAGES	1	5	10	15	20	25	30	35	40	45	50
I Simple	5.5	27.5	55.0	82.5	110.0	137.9	165.0	192.5	220.0	247.5	275.0
Average	10.3	51.5	103.0	154.5	206.0	257.5	309.0	360.0	412.0	463.5	515.0
Complex	17.3	86.5	173.0	259.5	346.0	432.5	519.0	605.5	692.0	778.5	865.0
II Simple	3.3	16.5	33.0	49.5	66.0	82.5	99.0	115.5	132.0	148.5	165.0
Average	5.6	28.0	56.0	84.0	112.0	140.0	168.0	196.0	224.0	252.0	280.0
Complex	9.0	45.0	90.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0
III Simple	1.9	9.5	19.0	28.5	38.0	47.5	57.0	66.5	76.0	85.5	95.0
Average	2.5	12.5	25.0	37.5	50.0	62.5	75.0	87.5	100.0	112.5	125.0
Complex	3.3	16.5	33.0	49.5	66.0	82.5	99.0	115.5	132.0	148.5	165.0

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