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AN ANALYSIS OF THE PROCUREMENT ADMINISTRATIVE LEADTIME (PALT) AT THE NAVY AVIATION SUPPLY OFFICE (ASO)

by

Brooks P. Merritt, Jr.

June 1987

Thesis Advisor: Raymond W. Smith

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An Analysis of the Procurement Administrative Leadtime (PALT) at the Navy Aviation Supply Office (ASO)

by

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ABSTRACT

The purpose of this thesis is to determine if there are contracting techniques that can be employed to reduce procurement administrative leadtime (PALT) for the procurement of spare parts at the Navy Aviation Supply Office (ASO). Findings were that implementation of the initiatives in the Competition in Contracting Act (CICA) of 1984 and Section 908 of the FY87 DOD Authorization Act has resulted in increased PALT. Reasons for this increase in PALT include the establishment of a Competition Advocate; processing of justifications and authorizations (J&As); increased synopsis time in the Commerce Business Daily (CBD); a reduced threshold for contractors' certified cost or pricing data; and missed requirement dates due to prospective pricing of BOA orders. The major conclusion is that ASO is using the appropriate contracting techniques for spares procurement. A spirited application of those techniques to streamline the procurement process may reduce PALT.

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I. INTRODUCTION

A. BACKGROUND

Since the early 1980's, the Department of Defense (DOD) has undertaken a highly aggressive and successful program aimed at reducing spare parts prices and increasing competition among prospective contractors. While the recent initiatives have satisfied this overall goal, they have had undesirable side effects, among them growing procurement leadtimes. Perhaps the fastest growing segment of wholesale (material managed by inventory control points (ICPs)) procurement leadtimes in recent years is the administrative processing time required to award a contract for spare parts. A recent study concluded that procurement administrative leadtime (PALT) has increased as much as 60% at some inventory control points and has shown dramatic overall growth at all procurement activities. According to the study, it now routinely takes almost nine months of administrative processing time just to place a spare parts order for wholesale stock. [Ref 1: p.I-3]

The period of the early 1980's was marked by a great deal of turmoil for the DOD spare parts procurement process. The news media were filled with harsh headlines assailing DOD's shoddy business practices and inadequate controls over the procurement process. Headlines focused on "horror" stories describing DOD's purchase of $100 diodes, $436 hammers, $337 nuts, $640 aircraft

toilet seats, $659 aircraft ash trays, and $37 screws. These are but a few of the more popular and well-publicized examples of spare parts overpricing that grabbed the public's attention and started a wave of procurement reform the magnitude of which the nation had not seen in over 36 years. The spare parts issue is big and pervasive. DOD has in the past paid exorbitant prices for spares, and there have been many cases of "apparent" overpricing on items that are, in fact, reasonably priced. Nonetheless, there is a general public perception that DOD has historically done a poor job of managing the procurement of spare parts.

The genesis of recent procurement reform was the publication of the Carlucci Initiatives in the spring of 1981. The Carlucci Initiatives, as the first major policy thrust of newly-appointed Deputy Secretary of Defense Frank Carlucci, were designed to improve overall DOD management and provided the impetus for subsequent initiatives and legislation. Reacting to the mounting criticisms of overpricing, waste, mismanagement, and to a certain extent favoritism in the selection of contractors, government agencies began to tighten up. Numerous policy directives were promulgated and Congress launched an intensive pursuit to seek demonstrably more competition and more stringent restrictions on the awarding of sole source contracts.

Numerous bills were introduced, and committee hearings were held, finally coalescing in the passage of three new major laws in 1984: The Competition in Contracting Act (CICA), which overhauled and replaced a good portion of the Armed Services

Procurement Act (ASPA) and Title III of the Federal Property and Administrative Services Act (FPASA) which governed procurement by most civil agencies; the Defense Procurement Reform Act (P.L. 98-525); and the Small Business and Federal Procurement Competition Enhancement Act (P.L. 98-577). These laws represented the first overall reform of the procurement statutes in over 36 years.

As a result of these laws, specifically the Competition in Contracting Act, the statutory emphasis has now shifted from the *method* (emphasis added) of procurement to the *use of multiple sources* (emphasis added). No longer is how you procure the principal matter of the law; rather it is from whom you procure that is the foremost concern. While the preference for formal advertising over the negotiated method of procurement still exists, the law now emphasizes competitive procurement from among multiple sources over procurement from single or sole sources. The renewed emphasis on competitive procurement, the law of the land, has resulted in substantial dollar savings to the taxpayer. Competition drives prices down, resulting in more realistic pricing decisions, fewer cost overruns, and lower program costs.

Despite the well-documented benefits of competition and notwithstanding the recent major legislation, it is the author's opinion that PALT has and will continue to increase. Price analysis and review, breakout, streamlining and other related initiatives, while well-designed and well-intended, have clearly increased wholesale administrative leadtimes and resultant

inventory levels. The DOD system, in attempting to respond to a multitude of external and internal pressures for improvement in the procurement process and in the degree of price competition, has become so cumbersome that leadtime management problems have been generated.

B. PROCUREMENT ADMINISTRATIVE LEADTIME (PALT)

PALT is referred to as the time interval between the initiation of a procurement action and the award of a contract. PALT is one of the two component parts of procurement leadtime (PCLT); forecasting PCLT is a key factor in the inventory management process because it helps determine when an order will be placed and the quantity of material held in inventory. As administrative leadtimes lengthen, safety level requirements also grow and order quantities are increased for the heavier processing workload requirements; the resultant increases can be viewed as costs associated with the savings derived from the process of competition. Procurement leadtime consists of:

a. Administrative leadtime (ALT or PALT) - the time from when the requirements document is generated to the date when the contract is signed.

b. Production leadtime (PLT) - the time from the date of the contract to the date of receipt of the first significant contract delivery. [Ref.2:p.1]

The acquisition process consists of a series of interrelated steps that are required to be performed and which, due to their

complexity and the requirement to meet statutory guidelines, add significantly to the time required to award a contract. The first key step is development of a comprehensive strategy or plan to fill the identified need, and includes the determination of the Government's requirement and a detailed overall plan to accomplish the procurement. The next phase consists of developing the specification for the requirement and includes the preparation of the purchase request (PR) which contains all of the acquisition requirements such as potential sources of supply or sole source justifications; proposal evaluation and source selection criteria; contract cost estimates; and the citation of funds to be committed.

Once the PR is received by the contracting officer, the procurement plan is developed. Receipt of the PR marks the beginning of PALT. The PR is reviewed for accuracy and content and a series of actions are performed by the contracting officer's staff to ensure that a product is obtained that meets the requester's needs in a timely manner and at a reasonable cost. The specific activities performed in the procurement planning stage add significantly to PALT due in large measure to the statutory requirements that must be adhered to to ensure that the required material is purchased at a fair and reasonable price in a competitive environment.

At the conclusion of a thorough review of the PR and detailed planning for the procurement, the solicitation document is prepared and synthesized in the U.S. Department of Commerce newspaper, the Commerce Business Daily (CBD) for all solicitations

over $25,000. The CBD synopsis is an important part of the process because it announces in advance of release of the solicitation that the Government is looking for qualified suppliers to fill a particular need. The solicitation document is issued and reflects all key decisions made in the initial planning stage and culminates in the issuance of either an invitation for bids (IFB) for sealed bid type procurements or request for proposals (RFP) for competitive proposal procurements.

Once the vendors' offers are received, the source selection phase begins. This is the process by which offers from the private sector are weighed by the Government against its stated needs, terms, conditions, and evaluation standards and a contractor is selected. Some of the key elements in this phase include technical evaluation of the offers, on-site evaluations and preaward surveys (to determine the technical and financial capabilities (responsibility) of the offerors), and price/cost analysis. Under the sealed bid method of procurement, contractors submit their bids and a public bid opening is held and the responses recorded. Late bids and modifications are handled as appropriate and the bids are reviewed for mistakes and missing information. The responsiveness of contractors to the IFB is determined, and the low, or most responsive, bidder is identified. The contract is awarded to the lowest cost, most responsive bidder. Under the competitive proposal procurement method, proposals are received from contractors in response to an RFP. The contracting officer determines the competitive range and negotiations take place with

the selected offeror for such things as terms and conditions, price, and type of contract. The source selection phase is followed by award of the contract. If the sealed bid method is utilized, the contract is awarded to the lowest cost, most responsive bidder while under competitive proposal procurement, the contract is awarded to the contractor who proposes the most advantageous offer, price and other factors considered. It is at this point that PALT ends; award of the contract to the successful offeror is synopsized in the CBD and the contract administration phase of the procurement process commences.

While all of the various phases of the procurement are not tied to a specific timetable, sufficient time must be allowed to enable prospective contractors to submit bids and proposals and allow for the orderly processing of the procurement. The only portion of the procurement process that has a statutory time requirement is the CBD synopsis. Under current rules, the solicitation document must be publicized 15 days in advance of its issuance, and the contract cannot be awarded less than 30 days after release of the solicitation document. Most of the procurement-critical decisions usually occur prior to the start of PALT; since PALT marks the point of transfer of responsibility for the procurement action from the requestor to the contracting officer, requirements must be defined, funding secured, and acquisition planning accomplished prior to the start of PALT.

PALT is an important consideration in the procurement process because excessive administrative leadtime inhibits the contracting

officer's ability to award the contract in a timely manner and obtain required material for the end user. While CICA has abandoned the preference for formal advertising and the great deal of effort required to write formal determinations and findings for negotiated procurements as well as processing requests for authority to negotiate through all echelons of the particular government agency, one would expect that PALT would be reduced. Instead, CICA has added new administrative impediments and constraints that have resulted in increased PALT. A more detailed review of the component parts of PALT as well as CICA and other statutes that have had an effect on PALT will be presented in Chapters II and IV of this study.

C. FOCUS OF RESEARCH

The primary thrust of this study is to discuss, analyze and evaluate the spare parts procurement process at the Navy Aviation Supply Office (ASO) in Philadelphia, PA. Factors internal and external to the purchasing organization that contribute to the amount of time necessary to process procurement actions generated by the Supply Demand Review (SDR) requirements determination process will be analyzed with a view toward presenting recommendations that will assist in the overall reduction of PALT at ASO.

The goal of the research is to provide contracting personnel at ASO with the tools that will enable them to procure spare parts more expeditiously than is currently the case, without sacrificing

the benefits of CICA and other procurement legislation. By having at their disposal tailored contracting methods/types/vehicles, ASO will benefit from the resultant reductions in PALT and overall procurement leadtime for spare parts. The research and recommendations will in turn have wide implications for the Navy and DOD's spare parts management improvement efforts.

D. RESEARCH QUESTIONS

Based on the objective cited above, the following primary research question is addressed in this study:

> Are there contracting techniques that can be employed to reduce PALT for spare parts procurement and if so, what are they?

In support of the primary research question, the following subsidiary questions are addressed:

1. What are the essential components of PALT?

2. How have recent DOD initiatives to reduce spare parts prices and increase competition affected PALT?

3. Do recent DOD initiatives relative to spare parts procurement adequately address PALT?

4. What are the principal contracting techniques currently used for spare parts procurement?

5. What contracting methods/types/vehicles can be effectively used to reduce PALT without sacrificing the benefits of reduced spare parts prices and increased competition?

E. RESEARCH METHODOLOGY

The primary impetus for this research was a study completed by the Logistics Management Institute (LMI) in September 1986. At the request of the Spares Competition and Logistics Technology Program Office (PML550) of the Naval Supply Systems Command (NAVSUP), the researcher used this study as the basis and focal point for further research.

The information presented in this research effort was obtained through primary and secondary research. Primary research consisted of personal interviews of key individuals within the ASO Purchase, Breakout, BOSS Program Management, Comptroller, Weapon Management, and Systems Development Divisions. The structure of the interviews was established from a series of questions identified during an extensive review of the current literature. Other types of data utilized in this study were local documents, reports and activity records that were provided by ASO personnel.

The secondary research methodology employed was an extensive review of relevant literature. The review was conducted to obtain an historical perspective of PALT issues. The literature utilized was obtained from multiple sources, including the Naval Supply Systems Command (NAVSUP), the Naval Postgraduate School library, the Defense Logistics Studies Information Exchange (DLSIE), the Army Procurement Research Office (APRO), the Air Force Business Research Management Center (AFBRMC) and the Air Force Logistics Management Center (AFLMC). In addition, the

Institute for Defense Analyses, current Federal and DOD regulations, supplementary directives, previous PALT studies, previous theses, and a review of current publications and periodicals relevant to the field of Federal procurement and procurement administrative leadtime (PALT) were also utilized. These useful sources of information are contained in the reference and bibliography sections of this paper.

The information thus obtained was analyzed, compared and contrasted in order to obtain a clear picture of the various institutional forces, effects and considerations relevant to the issues and problems associated with the management of PALT in the spare parts procurement process.

F. SCOPE OF THE STUDY

This study is limited to studying the procurement process for aviation spare parts with a dollar value in excess of $25,000. Due to the complex and technical nature of parts procured by ASO, the researcher did not study ASO's small purchase ($25,000 or less) function since it represents a relatively small segment and dollar value of the overall procurement effort.

The study focuses on the procurement process from the time a replenishment requirement is identified and initiated by the Supply Demand Review (SDR) process until a contract is awarded to a vendor. This study also presents and analyzes the regulatory changes that have occurred over the last three years and how these changes have affected the efficiency of the procurement

process at ASO. In addition, an in-depth review and analysis of the LMI study on procurement leadtime will be presented with observations relative to the degree of application or relevance to the procurement process and PALT at ASO.

G. ASSUMPTIONS

Throughout this study, it is assumed that the reader is familiar with the Federal Acquisition process and the limitations and idiosyncrasies associated with it. It is further assumed that the reader is familiar with basic Naval terminology and with basic contracting and acquisition terminology. If the reader desires, detailed information on the procurement process may be obtained in the Federal Acquisition Regulations (FAR) and the Defense Supplement to the Federal Acquisition Regulations (DFAR).

H. ORGANIZATION OF THE STUDY

This thesis is organized to give the reader a comprehensive overview of PALT at ASO and the acquisition environment that inhibits the process. Chapter II provides an in-depth review and description of the procurement process, both from a generic sense and as it pertains to ASO. The review of the procurement process provides a detailed explanation of the PALT components of the process.

Chapter III provides a review of the acquisition environment and focuses on the two major initiatives (The Competition in Contracting Act (CICA) of 1984 and Section 908 of the FY87 DOD Authorization Act concerning undefinitized contractual actions (UCAs)) that have had the most significant effect on the procurement process and PALT at ASO in recent years. Chapter IV presents an analysis of variance (ANOVA) of PALT statistics at ASO covering the period from October 1984 through March 1987.

Chapter V describes and analyzes the various contract types and contracting methods available to procurement personnel. The researcher used a "decision matrix" to weigh the various contract types and contracting methods against ASO's specific needs and concerns to arrive at a decision on the most feasible contract types and methods that can be used by procurement personnel to keep PALT to a minimum, given the present legislative constraints. Chapter VI provides conclusions of the research effort and offers recommendations for methods to reduce PALT and provide for a more efficient and expeditious procurement process at ASO.

II. THE PROCUREMENT PROCESS

A. INTRODUCTION

This chapter focuses on the specific steps in the procurement process that, taken as a whole, define the complexity of the administrative process and give more meaning to the elements of PALT. A brief introduction to the process was presented in the previous chapter; what follows is a chronological description of each step of the generic procurement process. Following this discussion, a detailed description of the procurement process at ASO will be presented.

B. THE PROCUREMENT PROCESS

1. The Generic Procurement Process

The procurement process, depicted in Figure 1, encompasses all phases related to the acquisition of supplies and services for and by the Government. It begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract. [Ref. 3: Para. 2.101]

In the presolicitation phase, the agency analyzes its capability to achieve its mission and then determines a need for

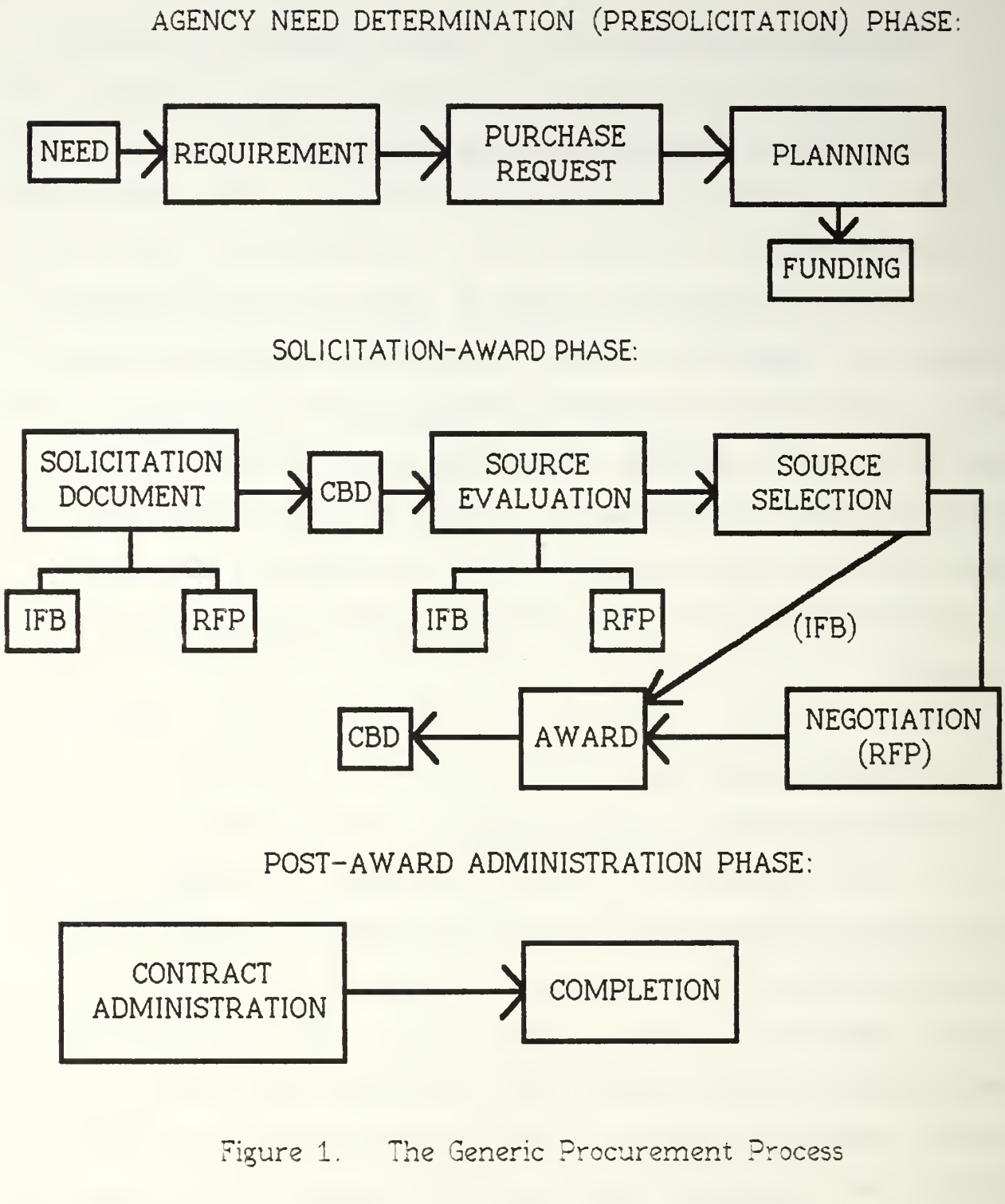

Figure 1. The Generic Procurement Process

Source: Developed by researcher

products and services. The needs satisfaction analysis phase consists of the agency deciding whether or not to use existing material in stock. If the decision is made to procure material, the agency prepares for filling the identified need by contract in the most economical, timely, effective, efficient, and equitable manner. The agency develops a formal statement of its need for products or services and the associated terms and conditions under which it seeks formal responses from the private sector.

Evaluation and selection is the portion of the solicitation-award phase in which responses from the private sector are weighed against stated needs, terms, conditions, and evaluation standards, and a supplier is selected. The contract award phase consists of the agency and supplier reaching a "meeting of the minds" and reflecting their mutual understanding in a written instrument defining each other's rights and obligations. Post-award administration involves each of the parties discharging their obligations under the contract, with oversight, surveillance, and engagement by the Government as appropriate. Finally, the completion stage includes the contractor providing the product or service contracted for as well as Government acceptance of the goods.

2. Steps in the Procurement Process

The key steps in the procurement process are detailed below. While generic in nature, the steps described may not occur in the exact sequence since the process may differ according to the agency conducting the procurement; the goods or services

required; the size, type, and complexity of the procurement; the economic interests and public concerns in a given transaction; and the laws and procedures that govern each case.

a. Agency need determination (presolicitation phase)

Agency need determination is the step by which a comprehensive plan is developed to fill an identified need by contract in the most economical, timely, effective, and equitable manner. Within this step is the determination of the Government's requirement. A continuous mission analysis is performed; a formal need statement is prepared; liaison is established between the program office and the contracting office; procurement planning is initiated; the program is formulated and approved; advance cost estimates are prepared; budget authorization and appropriations are prepared; and the project is selected and approved. The choices of how to meet the Government's needs range from procurement of off-the-shelf commercial items, use of "in-house" or intragovernment resources to the acquisition of special items from the private sector.

If the decision is made to contract for the required material, the requirement specification is then developed. A market survey is performed and the requirement is specified in terms of a:

- statement of work;
- functional specification;
- performance specification;

- commercial item description; or
- other purchase description.

After the requirement is described, a list is prepared delineating the required Federal and Military Specifications and Standards. Quality and quantity requirements are determined; delivery and performance requirements are set; and other contract requirements are specified, such as:

- financial reporting by the contractor;
- subcontracting requirements;
- technical data considerations;
- contractor management systems;
- government furnished property and equipment;
- spare parts provisioning; and
- industrial security.

Next in this step is the preparation of the purchase request (PR) which contains all of the user's requirements. It specifically includes a potential source(s) of supply or sole-source justification; contractor proposal evaluation and source selection criteria; contract cost estimates; and citation of the funds that are being committed for the procurement. As part of the overall acquisition plan, a procurement plan is developed by the contracting officer and his staff.

More than ever before, thorough and realistic advance acquisition planning is being stressed in Government procurement. To succeed in conducting and concluding sound procurements, it is fundamental and essential to plan for the acquisition of products

needed by the Government. Planning is perhaps the most important phase of the procurement cycle because it improves the likelihood that the contract will achieve its intended objective. Planning is the process by which the efforts of all personnel responsible for an acquisition are coordinated and integrated through a comprehensive plan for fulfilling the agency's needs in a timely manner and at a reasonable cost. It includes developing the overall strategy for managing the acquisition, analyzing objectives, and setting priorities. The overall mission of every procurement is to obtain a product or service that meets user needs in a timely manner at a reasonable cost [Ref. 3: Para. 7.101]. Elements of the procurement plan consist of the following, as appropriate:

- Review of the procurement request, including feasibility of specifications, purchase descriptions, or statements of work;
- Review of time requirements and sufficiency of funds;
- Determination of the availability of sources of supply;
- Review and approval of proposal evaluation and source selection criteria;
- Development of a source selection plan;
- Determination of competitive procedures (sealed bidding or competitive proposals);
- Selection of type of contract;
- Assessment of market conditions and availability of qualified sources;

- Small business and labor surplus area set-aside determinations;
- Subcontracting requirements;
- Screening for small disadvantaged concerns program potential;
- Requirements for acquisition from Government-established mandatory sources;
- Procurement history of the product or service;
- Identification of long lead items;
- Determination of the kind of competition (price, technical, life cycle costing, design-to-cost);
- Considerations for increasing competition, such as CBD synopsis; breakout potential; economic order quantity; splitting or combining requirements; second sourcing; commercial/foreign sales potential; and the Government's market research efforts;
- Availability of Government furnished equipment (GFE);
- Establishing leadtime standards and milestones for the procurement;
- Justifying and obtaining approval for noncompetitive procurement;
- First article approval requirements;
- Assessment of performance risks;
- Contract financing alternatives;
- Identification of special contract alternatives;
- Clearances and approvals to be obtained from higher authority;

- Determining the need for deviations from the Federal Acquisition Regulation (FAR) or other regulations;
- Assignment of contract administration functions;
- Scheduling of completion times for each task; and
- Assignment of tasks to specific persons.

b. Solicitation-award phase

The solicitation-award phase is concerned with structuring a formal statement of the need for the required material and the associated terms and conditions under which the Government will seek formal offers from the private sector to fill that need. The solicitation document reflects all key decisions made in the initial planning phase. An invitation for bids (IFB) is used to solicit competitive sealed bids in the sealed bidding method of contracting while a request for proposals (RFP) is used to solicit competitive or noncompetitive proposals in contracting by negotiation. As described in the FAR [Ref. 3: Part 14], the sealed bidding method of contracting is used when (1) time permits the solicitation, submission, and evaluation of sealed bids; (2) the award will be made on the basis of price and price-related factors; (3) it is not necessary to conduct discussions with responding offerors about their bids; and (4) there is a reasonable expectation of receiving more than one sealed bid. The elements of the sealed bidding process are as follows:

- Preparation of IFBs that clearly, accurately, and completely describe the Government's requirements;

- Publicizing the IFB through distribution to prospective bidders, posting in public places, and synopsizing in the Commerce Business Daily. This enables prospective bidders to prepare and submit bids;

- Submission of bids to be opened at the time and place stated in the solicitation for the public opening of bids;

- Evaluation of bids without discussions with bidders; and

- Contract award following public opening of bids to the responsible bidder whose bid conforms to the IFB and is considered the most advantageous to the Government based only on price and other price-related factors included in the solicitation.

In contrast, the FAR [Ref. 3: Part 15] describes contracting by negotiation as a process that involves the use of competitive proposals and discussions with offerors. Negotiation is a procedure that includes the receipt of proposals from offerors, permits bargaining, and usually affords an opportunity to revise their offers before award of a contract. Bargaining between the parties can apply to price, schedule, technical requirements, type of contract, or other terms of a proposed contract. The essential evaluation factors of negotiated procurement include:

- The factors that will be considered in evaluating proposals are tailored to each acquisition and include only those factors that will have an impact on the source selection decision;

- The evaluation factors that apply to an acquisition and the relative importance of those factors are within the broad discretion of agency acquisition officials. Price or cost to the Government are an evaluation factor in every source selection. Other factors may include cost realism, technical excellence, management capability, personnel qualifications,

experience, past performance, schedule, and any other relevant factors;

- While the lowest price or lowest total cost to the Government is normally the deciding factor in many source selections, in certain acquisitions the Government may select the source whose proposal offers the greatest value to the Government in terms of performance and other factors;

- The solicitation document clearly states the evaluation factors, including price or cost and any significant subfactors, that will be considered in making the source selection and their relative importance; and

- The solicitation informs offerors of minimum requirements that apply to particular evaluation factors and significant subfactors. [Ref. 3: Part 15.605]

The first part of the solicitation-award phase consists of preparing the solicitation document and synopsizing the requirement, and includes such actions as:

- Preparation of a source list;

- IFB or RFP contents as set forth in the FAR, including:

  - The Government's requirement in the form of a specification, purchase description, or statement of work;

  - Mandatory FAR provisions and clauses;

  - Special terms and conditions;

  - Pertinent labor law requirements;

  - Representations and certifications;

  - Bond requirements;

- Source evaluation criteria and their relative importance;
- Delivery or performance requirements;
- Requirements for subcontracting plans;
- Requirements for cost or pricing data;
- Bid samples or first article approval requirements;
- Precise date , time, and place for submission of bids, and date and time of public bid opening, in sealed bidding; and
- Precise date and place for submission of proposals in procurement by negotiation;

- Qbtaining required legal, funding, and contract clearance reviews;
- Synopsizing in the Commerce Business Daily (CBD);
- Effecting other pre-solicitation publicity;
- Including any special instructions to offerors;
- Mailing the solicitation;
- Public posting of the solicitation; and
- Resolving any protests from contractors that may arise.

Under the sealed bidding method, the source evaluation stage of the process involves the opening of bids at the precise time and place specified in the IFB. The bids are recorded and an abstract of the offers is prepared. Minor informalities or irregularities are corrected and offerors are permitted to correct any apparent clerical mistakes as necessary. Finally, the con-

tracting officer makes a determination that prospective contractors are responsible and that the prices offered are reasonable before awarding the contract.

In negotiated procurement, source selection procedures are designed to (1) maximize competition; (2) minimize the complexity of the solicitation, evaluation, and the selection decision; (3) ensure impartial and comprehensive evaluation of offerors' proposals; and (4) ensure selection of the source whose proposal has the highest degree of realism and whose performance is expected to best meet stated Government requirements. The elements of source selection in negotiated procurement include:

- Determining the competitive range by evaluating each proposal in light of all elements specified in the solicitation, including cost and price, evaluation criteria, statement of work, and specifications;
- Evaluation of offerors' proposals, considering such factors as cost or price, cost realism, technical excellence, management capability, personnel qualifications, experience, past performance, schedule, and any other relevant factors;
- Notification of offerors not found within the competitive range; and
- Preparation of the negotiation strategy.

The source selection stage of the process consists of weighing offers from the private sector against stated needs, terms, conditions, and evaluation standards and a contractor is selected. In the sealed bidding method, the contract is awarded

to that responsible bidder whose bid, conforming to the IFB, will be most advantageous to the Government, considering only price and the price-related factors included in the solicitation. Under negotiated procurement, the contracting officer determines which proposals are in the competitive range for the purpose of conducting written or oral discussions; the competitive range is determined on the basis of cost or price and other factors that were stated in the solicitation and includes all proposals that have a reasonable chance of being selected for contract award. At the conclusion of discussions with the offerors, the contracting officer issues a request for best and final offers (BAFO). The contracting officer awards the contract after taking into account the various source selection criteria and the recommendations made by the source selection authority.

c. Post-award administration phase

Post-award administration is the final phase of the procurement process; its primary objective is to see that the user (the Government) gets the necessary requirement filled within the time limits specified in the contract at a fair and reasonable price as well as ensuring the contractor's compliance with the terms and conditions of the contract. Typical activities conducted during this phase include production and performance surveillance, cost monitoring, quality assurance and inspection, product acceptance, contract disputes, contract terminations, and payment for work performed and material delivered by the contractor. Post-award administration is a critical phase in the acquisition process to the

extent that many of the allegations of waste, excessive costs, and mismanagement point to shoddy contract administration practices.

C. THE ASO PROCUREMENT PROCESS

ASO uses the Uniform Inventory Control Point (UICP) replenishment model to trigger the start of the procurement process, which is conceptually depicted in Figure 2. The UICP model takes into consideration many variables in determining the reorder quantity and reorder point. The reorder quantity refers to how much to order while the reorder point refers to when to order. The variables include, but are not limited to, the mean administrative leadtime (ALT), mean production leadtime (PLT), mean quarterly demand, associated variances, item costs, holding costs, and administrative ordering costs. Funding is made available through the use of the Navy Stock Fund (NSF) which is based on a pool of funds that is recycled and never expires. Funding is a limiting factor and since ASO, like other DOD activities, is sometimes faced with inadequate or unstable funding levels, the model is adjusted accordingly. These variables are input into a program referred to as Supply Demand Review (SDR) which is run periodically to trigger the initiation of the procurement process. The SDR process makes a buy recommendation for material shortages that are expected to occurleadtime away. The SDR recommendation takes 5-10 days to produce and depends on how often the computer is scheduled to run the program.

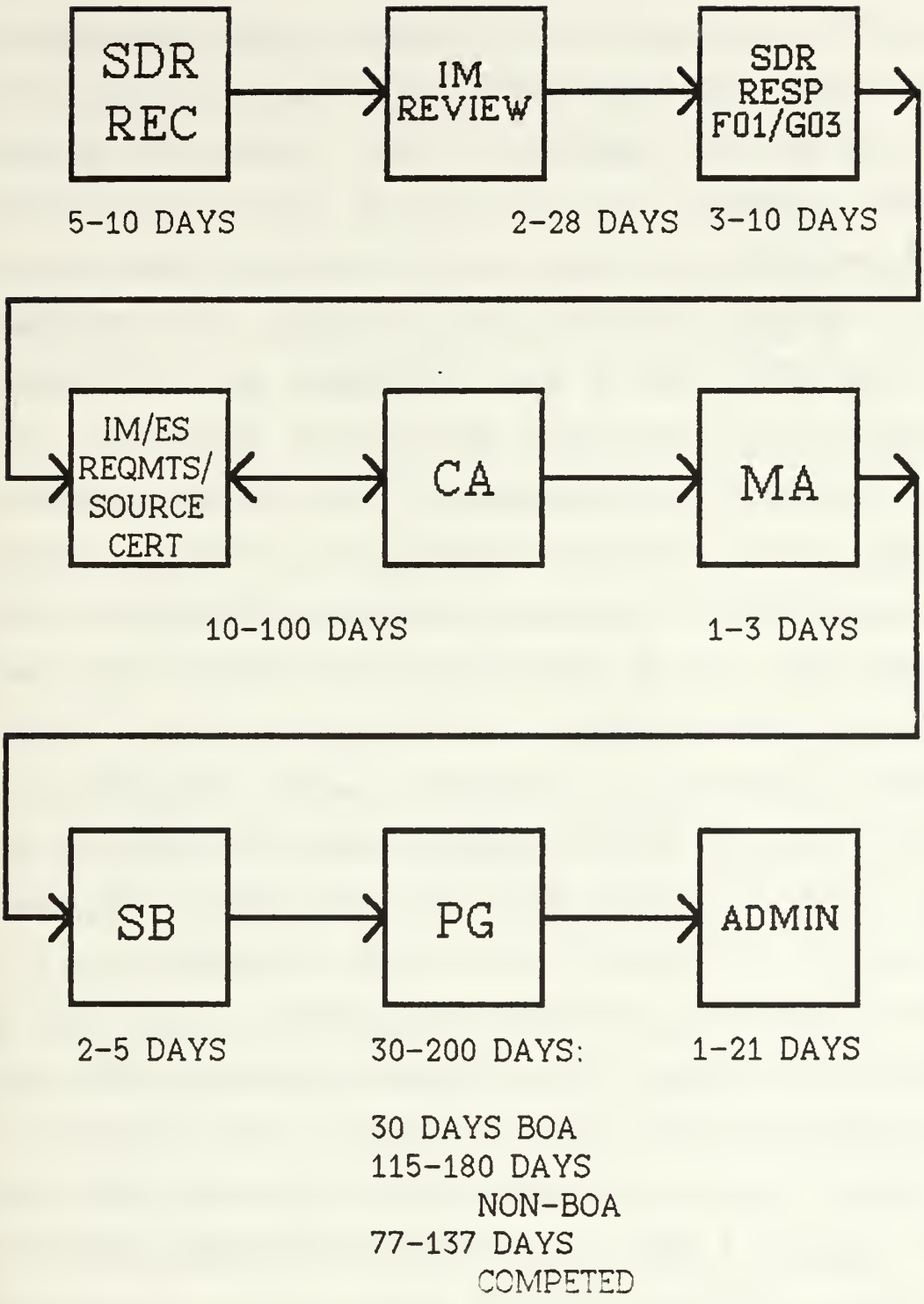

Figure 2. The ASO Procurement Process

Source: ASO Systems Development Branch

The SDR recommendation is forwarded to the item manager (IM) who reviews the requirement and makes a recommendation whether to buy the material or not. Often the IM has information available from the fleet or other sources about expected fluctuations in demand patterns and has a good feel for changes in normal demand for the commodities he/she manages. The IM carefully reviews the requirement and recommends adjustments to the Master Data File (MDF) as appropriate. The IM then forwards his recommendation to the equipment specialist (ES) who, through technical expertise and in-depth knowledge about the commodity in question, certifies the technical aspects of the requirement. ASO's requirements review board (RRB) then validates the recommendation of the IM and ES and makes appropriate adjustments to the computer model. The RRB can be viewed as a quality control monitor during this stage of the process. The IM review phase can take from 2-28 days, depending on the complexity of the material in question.

Once the decision is made to purchase material (in response to the SDR recommendation), the automated procurement (F01) and accrual accounting (G03) programs are run. This procedure in effect creates what is commonly referred to as the "F01 buy package", which is a folder containing all of the needed information (procurement worksheet (NAVSUP Form 1275), procurement history, production schedule, etc.) to effect the purchase of the material. With the implementation of a local internal procurement tracking system at ASO in November 1985, the F01

package contains a computer-generated bar code which is used within the Purchase Branch (PG) to track each folder through the various stages of the buying effort. The internal tracking system is called Work In Process (WIP) and is an integrated data base that provides a daily update of the Document Status File (DSF). The WIP permits the orderly tracking and accumulation of PALT within PG and provides management tools in the form of reports and lists that identify procurements assigned to each buyer, whether the buy is competitive or not, the dollar value of the procurement, age of the requirement, and other management information. The WIP is used by management to monitor contract close-out and other internal activities from start to finish. The WIP system is being expanded to include all departments, divisions, and sections involved in the procurement process; while not fully implemented at the present time, after installation and initial training of personnel the entire procurement process will be monitored by the WIP.

The PALT clock starts ticking at ASO at the point when the SDR response is certified by the RRB and the response is manually input into the computer to produce the F01. The SDR response phase takes from 3-10 days to complete. It would seem that the SDR recommendation and IM review phases should be included in the PALT computation. An average of 7-38 days is represented in these stages, but since technically speaking a firm requirement has not been identified and certified, this block of time is considered

"dead time" because the IM, ES and RRB are in the process of validating the computer-generated requirement.

The next phase of the process is source certification by the IM/ES team. Included in this phase are administrative functions performed by the Weapon Management Branch (WM) clerks and includes logging the F01 on the WIP system and sorting and assigning the F01 folders to the appropriate ES. The ES is the technical expert whose primary responsibility is to perform a technical review of the item which includes: reviewing the item's procurement and price history; looking for technical disconnects in the package and correcting them as required; exploring alternate sources; and reviewing technical drawings obtained from the Naval Air Technical Services Facility (NATSF) or other sources (including vendors). The ES obtains technical drawings by means of a DD1149 (Order For Supplies And Services) from NATSF and performs a limited screen of the item. This screen is a detailed look at the technical aspects of non-complex items such as airframe components like brackets or electronic circuit cards consisting of a limited number of piece parts. The ES limits his technical review to the top level drawing. More complex items like circuit boards and other sophisticated items are subjected to a more thorough and complete technical review along with a full breakout screen by the Competition Advocate (CA) breakout division. The breakout process attempts to break out the item to competition vice relying on prime vendors to supply the material obtained from sub-vendors when they add no intrinsic value to

the item. The breakout division's responsibility includes a review of the top level drawings provided by the ES as well as ordering additional drawings for the additional tiers of a complex item from NATSF. In the course of the ES's technical review, the status of completed or pending breakouts is obtained from the breakout division to simplify the process and increase the accuracy of the source determination decision. It should be pointed out that every requirement reviewed by the ES requires a new drawing from NATSF to ensure that the latest equipment configuration changes are reflected in the technical and breakout screening process.

The ES also prepares a source certification procurement record (SCPR), completes the required competition advocate (CA) form, and also prepares a justification and authorization (J & A) for sole source procurements as required. In addition, the ES indicates required first article or first production lot testing requirements on the DD1149 for use by the buyer in selecting appropriate contract clauses. The completed forms are forwarded to the IM who completes the CA form by adding a fleet impact statement. The WM clerks key all of this information into the WIP system and forward the forms to the Competition Advocate Directorate for a breakout screen as required.

With the passage of CICA in April 1984, ASO is required, as are many DOD activities, to increase the level of competitive procurements. This requirement has led to the creation of the Competition Advocate (CA) Directorate whose primary purpose is to promote and assure the maximum use of competition.

Competition at ASO is closely tied with the Navy's Buy Our Spares Smart (BOSS) program, specifications streamlining and spares breakout. The CA staff receives the required forms from the IM/ES and enters the information into the CA computer. The forms are then forwarded to the breakout division where technical information and ES certifications are reviewed. The Competition Advocate certifies sole source, non-competitive buys recommended by the ES after a review of the item is conducted and reveals that it cannot be broken out to competition. Once the appropriate forms are certified and signed by the breakout division, they are forwarded to the Competition Advocate for signature and returned to the IM. The IM consolidates the SCPR, CA, and J & A forms and forwards the F01 package to the Material Accounting Division (MA). The MA phase of the process involves a certification that funds to effect the procurement are available and thus reserved for the particular buy. This phase takes 1-3 days to complete.

The F01 package can, and often does, bounce back and forth between the IM/ES team and CA; this is shown by the double arrows in this segment of the process in figure 2. This apparent inefficiency is inherent in the process and is necessary to ensure that CA and the IM/ ES team are in agreement over the approved source(s) of supply. The average time it takes to cycle the F01 package through the ES/IM and CA phases is 10-100 days. To minimize any duplication of effort between IM/ES team and CA, the master computer contains information relative to breakout of the item. If an item is coded as not having been broken out for

competition, the F01 package is flagged for "CA interest". This alerts the ES to the fact that the breakout division will perform a full breakout screen and order the remaining drawings. In these instances the ES need only perform a limited screen of the item and thus save time and duplication of effort.

The next phase in the process consists of a review by ASO's Small Business Representative (SB) whose purpose it is to review PRs to ensure that maximum opportunity for participation in procurements is afforded to small business and small disadvantaged (8(a)) business concerns, labor surplus areas, and the severely handicapped. All PRs except base support requirements and sole source PRs less than $5,000 are reviewed by SB. The SB interface takes 2-5 days to complete.

The F01 package enters the Purchase or PG phase and accounts for the vast majority of PALT. The F01 is received by the Procurement Support Branch (PSP) who assigns the procurement to a buyer. The buyer reviews the F01 and prepares a checksheet indicating the type of procurement desired (sole source or competitive), applicable contract clauses to be included in the final contract, number of technical drawings to be mailed with the solicitations (as specified in the DD1149) as well as any other desired solicitation criteria, based on the acquisition management code (AMC) assigned the item. The package is returned to PSP who synopsizes the requirement, assigns a solicitation number to the procurement, and prepares the solicitation (IFB or RFP). In addition, PSP orders required technical drawings (as specified by

the buyer) from NATSF and the solicitation is forwarded to the Navy Publication and Printing Support Office (NPPSO) for reproduction. The entire synopsis period can take a minimum of 52 days (15 days in the presolicitation period, 7 days during the "waiting period" from the time the notice is forwarded to the Commerce Business Daily in Chicago until publication, and a minimum of 30 days after solicitations are mailed to prospective vendors).

The PSP Branch writes the requisition and solicitation numbers on the F01 and forwards the package to another section in the branch where the required contract clauses are manually keyed into the NIXDORF computer which provides an on-line interface with the master computer; whole clauses are not typed by the clerks but rather, specific clauses that have been programmed into the master computer are identified and requested for printing by the computer through the use of the NIXDORF interface. The NIXDORF process (before the solicitation is forwarded to NPPSO) normally takes two weeks. The normal waiting time for technical drawings from NATSF is 20-30 days and is often in excess of that, especially for technically complicated equipment. In addition, it takes NPPSO one week to reproduce solicitations and final contract clauses.

The F01 package is returned to the buyer. PSP mails the solicitations to prospective contractors; as bids are received during the synopsis period they are sent to the bid room for safekeeping until bid opening day. On bid opening day the bids are opened

and a bid abstract is prepared summarizing each bidder by name, unit price, quantity and bid price.

On the other hand, contractor proposals are forwarded to the bid room for opening and distributed to the buyer as they are received. Proposals are reviewed and analyzed by the buyer who determines the competitive range after an evaluation of the various elements specified in the solicitation. Factors such as cost or price, technical excellence of the contractor, cost realism, experience, past performance, schedule, and other relevant factors are considered. For sole-source procurements that do not have a price history (first-time buy), the buyer contacts the contractor to obtain a detailed cost breakdown or commercial sales history. If the procurement price is over $100,000, the contractor is required to prepare a SF 1411, Contract Pricing Proposal Cover Sheet, for review and audit by the Defense Contract Audit Agency (DCAA). A procurement of less than $100,000 requires an "informal" cost breakdown by the vendor. The buyer performs a detailed price and cost analysis as described in section B.2.b. of this paper.

A competitive proposal requires that the buyer establish a fair price based on commercial catalogs or fair market value. The vendors' pricing history and other factors described in the previous paragraph are reviewed and analyzed in order to determine which proposal offers the greatest value to the Government, price and other factors considered. The buyer next prepares a pre-negotiation business clearance; procurements of less than $100,000

in value are approved by the branch supervisor while procurements over $100,000 are approved by the Contract Review Board (CRB).

At the conclusion of discussions and negotiations with the contractors the buyer obtains best and final offers (BAFO) and prepares a post-negotiation business clearance and forwards it to the branch supervisor or CRB, as appropriate. Upon approval of the award by the branch supervisor or the CRB, the buyer prepares a DD350, Individual Contract Action Report (over $25,000). The F01 is then returned to PSP for consolidation of applicable contract clauses; the contract is reproduced by NPPSO and returned to PSP for mailing. The buyer mails a letter of award to the successful contractor and the MA Branch is notified of the award and the obligation of funds is recorded. PALT during this administrative phase also includes the printing and mailing of the contract as well as post-award activities required to put the contract in place. The F01 package is logged in and out and traced through every step of the PG phase of the process by means of the WIP system bar codes and wands. While the PG portion of PALT officially ends upon award of the contract by the buyer, overall ASO PALT does not stop until the administrative (ADMIN) phase has been completed; this phase takes 1-21 days. The PG portion of PALT averages 60-200 days depending on the type of award. Typically orders under BOAs take 30 days, non-BOAs take 115-180 days, while competitive procurements take 77-137 days to get through the PG loop.

During contract performance the buyer gets involved in contract administration efforts by expediting the delivery of required material. This is especially true in the case of small firms where a resident Administrative Contracting Officer (ACO) is not present. Where an ACO is assigned to administer the contract, the buyer, often prompted by the IM/ES team and urgent supply assist requests from the fleet, works closely with the ACO and his staff to expedite requirements and make fleet desires known.

D. SUMMARY

In the first part of this chapter an analysis of the generic procurement process was presented with a view toward putting the various elements of PALT in perspective. This was followed by a detailed explanation of the procurement process at ASO to provide the reader with a basic understanding of the complexities of the process of obtaining material for and by the Government. Hopefully the reader has gained an appreciation for the tremendously complex and labor-intensive nature of the spares procurement process at ASO. A discussion of the factors that impact upon PALT is presented in the following chapters and the author will evaluate those elements both internal and external to the ASO organization that affect PALT.

III. THE ACQUISITION ENVIRONMENT

A. INTRODUCTION

This chapter focuses on the two major pieces of procurement legislation that have been passed over the last four years and which have contributed to increased PALT at ASO. Following a discussion of the legislation, an evaluation is made of the overall impact the legislation has had on ASO's procurement process. Before continuing, however, it is important to mention that as each Federal agency receives changes to the procurement regulations, they are responsible for promulgating various internal directives and procedural changes to comply with the new regulations. Combine the multitude of changes that have taken place in recent years with the vast differences that exist between Federal agencies and the situation becomes even more confusing and cumbersome to administer by the people involved in the procurement process.

Over the last four years the Government, and in particular DOD, has received a great deal of negative publicity over the purchase of $400 hammers and $600 ashtrays. Each incident of media sensationalism instigates another round of Congressional inquiries of Federal agencies. With the Government procurement system under heavy attack, agencies have implemented internal measures to cope with the problems. For example, the Fraud,

Waste and Abuse Hotline was established in 1982 to provide Federal employees with a direct line to the head of the agency. Through the Hotline, an individual can surface pricing violations or wasteful practices.

DOD awards over 15 million contracts each year with a value in excess of $150 Billion. Even if all purchase transactions were 99.9% error-free there would still be 15,000 possible errors. Many of the problems are attributed to administrative errors with few actual cases of fraud being detected [Ref 4: p. 17]. Even so, Congress has seen the need to generate procurement legislation that, since 1982, has had a major impact on the Government's method of conducting its procurement functions. As the body that holds the ultimate power of the purse and the responsibility to ensure that public funds are wisely spent, Congress has had to act to ensure that the "horror stories" do not go unchecked.

The most sweeping change to the procurement regulations initiated by Congress since the Armed Services Procurement Reform Act of 1947 and the Federal Property and Administration Services Act of 1949 was the Competition in Contracting Act (CICA) of 1984. Since then, several other pieces of legislation have been enacted by Congress in an effort to eliminate problems arising from poor procurement practices. These include the Defense Procurement Reform Act of 1984, the Small Business and Federal Procurement Competition Enhancement Act of 1984, the Defense Procurement Enhancement Act of 1985, and the annual National Defense Authorization Acts. Although all of these reforms have

mandated changes to procurement procedures of one form or other, two of them, CICA and the National Defense Authorization Act for Fiscal Year 1987 (FY87 DOD Authorization Act) which puts into statute Navy's initiatives to reduce the number of undefinitized contractual actions, have had the most significant impact on PALT at ASO in recent times. The remaining statutes mentioned above are extensions of CICA and further amplify Congressional intent regarding the conduct of major systems acquisitions and business practices of Defense contractors. The researcher will therefore present a brief synopsis of these two pieces of legislation to provide sufficient information to give the reader an appreciation for the intent and policy behind the legislative changes.

B. THE COMPETITION IN CONTRACTING ACT (CICA) OF 1984

CICA is perhaps the single most important piece of procurement legislation enacted by Congress in nearly 40 years. Mandating sweeping changes to the procurement process, CICA is the direct result of national attention focused on the problems encountered in Government procurement [Ref. 4: p. 118]. Over 80 percent of all Federal contract obligations originate from DOD. For this reason the service Secretaries and senior military officials have spent many hours testifying before Congress and defended their much-publicized procurement practices. The overriding theme of the committee hearings and Senate and House floor debates has been that the Government needed to push

"competition" [Ref. 4: p.18]. The full impact of CICA on DOD agencies may take years to fully determine though it is certain that Congress is intent on forcing the Services to seek competitive contracts and thereby reduce the overall costs of procuring weapons systems for DOD.

To accomplish its main purpose, increased competition in the award of Government contracts, CICA created several new terms to replace terms that previously had non-competitive connotations. For example, the term "sealed bid" replaced "formal advertising" while "competitive proposal" replaced the term "negotiation." In addition to the changes in terminology, CICA changed the procedures required to effect the award of contracts under the sealed bid and competitive proposal methods of procurement. The various criteria were enumerated in the previous chapter and are presented here for review. Sealed bidding is the prescribed method for purchases over $10,000 if the following criteria are met: (1) the specification and requirements are non-restrictive; (2) time permits solicitation, submission and evaluation of all sealed bids; (3) the award will be made with reasonable promptness on the basis of price and other price-related factors; (4) bids can be evaluated without discussions with the bidders; and (5) there is a reasonable expectation of receiving more than one sealed bid.

If, however, the above criteria cannot be met, then the contracting officer must use the competitive proposal method. The primary reason for using the competitive proposal method is to promote and enhance the conduct of meaningful discussions with

each of the offerors. Following the discussions, the contracting officer will usually call for a best and final offer (BAFO) from each bidder. However, under the competitive proposal process, the contracting officer is required to reserve the right to award the contract without discussions if it is determined that the initial offers are acceptable and would result in the lowest overall cost to the Government. [Ref 4: p. 127]

The problem with the old standard (formal advertising) was that it equated the formal advertising method of procurement with competition but did not sufficiently recognize that negotiated procurements could also be competed. In addition, justifying the use of negotiation obscured the real intent behind the legislation, that of ensuring competitive procurements. CICA, therefore, clearly established a legislative precedent to compete all awards regardless of which method of procurement was utilized. [Ref 4: p.120]. As a result of CICA, the statutory emphasis has shifted from the method of procurement to the use of sources. No longer is how you procure the principal matter of the law; rather it is from whom you procure that is the foremost concern. CICA, therefore, for the first time clearly established a legislative requirement to compete regardless of the method of procurement. Under the provisions of the Act, Government agencies may use non-competitive procedures if the procurement falls into one of the following categories as described in FAR Part 6.302. The seven exceptions to procurement under less than full and open competition are:

1. When only one responsible source is available and noalternate type of service will satisfy its needs.

2. Under unusual or compelling urgency, when the Government would be seriously injured unless the agency limited the number of solicited sources.

3. When restriction of an award to a particular source is required because of:

   a. the necessity to maintain a particular source to ensure its continued availability in the event of national emergency or to achieve industrial mobilization or

   b. the award is required in order to establish or maintain an essential engineering research or development capability provided by an educational or other non-profit institution or a federally funded research and development center.

4. When the source is restricted under the terms of an international agreement or treaty or by direction of a foreign government that is reimbursing the executive agency for the cost of the procurement.

5. When the item is a brand name commercial item for authorized resale, or a statute expressly authorizes or requires that the source be restricted.

6. When national security requires that the disclosure of the executive agency's requirement be limited to the particular source(s) from which it solicits the bid or proposal.

7. When the head of the executive agency determines it to be necessary in the public interest to use procedures other than competitive procedures. This exception must be the subject of a written notification to the Congress, thirty days in advance of the award of the contract.

Depending upon the enforcement and interpretation of the exemptions when making an award, the contracting officer must prepare a Justification and Approval (J&A). CICA requires written J&As for all proposed contract actions not providing for full and open competition in excess of $25,000.

A major element of CICA that ensures the contracting officer is following the rules is the appointment of a competition advocate for each activity with procurement authority greater that $25,000. This senior procurement official is appointed by the commanding officer and is responsible for ensuring that full and open competition is maintained, that the exemptions are not inappropriately circumvented, and that all non-competitive procurements are reviewed. By design, Congress established the competition advocate system through CICA as a check and balance process to protect against abuses in the procurement process. [Ref. 5: p. 2].

Another major change imposed by CICA is the lowering of the threshold for the Truth in Negotiations Act (TINA) from $500,000 to $100,000. Under CICA, prospective contractors are required to certify their cost or pricing data (as of the date of the parties' agreement on price) for procurements valued at $100,000 or greater. This provision in the Act was intended to provide the basis for retroactive price adjustments in the event that data submitted prior to award of a contract are not accurate, complete, and current without resorting to costly and time-

consuming litigations. Without certification, agencies would lack the legal wherewithal to deter defective pricing. [Ref. 6: p. 6]

CICA also changed the required times for Commerce Business Daily (CBD) notices for solicitations and awards from the previous 15 day minimum to a new 45 day minimum synopsis plus transmittal time. The new rules mandate that solicitations involving $25,000 or more be synopsized in the CBD at least 15 days prior to release of the solicitation, and that deadlines for receipt of bids and proposals be not less than 30 days after publication of the synopsis. In addition, notice of award must also be published for procurement actions of $25,000 and over if subcontracting opportunities are likely to occur. CICA not only increased the time requirement for the synopsis but also added more stringent rules to the contents of the synopsis. The requirements for an acceptable synopsis are that: (1) it accurately describes the Government's requirement without unnecessarily restricting competition; (2) it must clearly state where a copy of the solicitation may be obtained and must provide the name, business address, and telephone number of the contracting officer responsible for the procurement; and (3) it must contain a statement that all responsible sources may submit offers for consolidation by the agency. In addition, if the agency expects to restrict the number of sources for a particular reason, that fact must be fully disclosed in the synopsis and must include the reason(s) for the restriction as well as the name(s) of the intended source(s) of supply. The exclusion might be necessary to

enhance competition in a particular service or supply area, for example, restricting competition to small business firms only when all small firms are allowed to compete for the procurement. [Ref. 4:p.131]

In general, the feelings about the impact CICA has had upon the procurement process are mixed. Contract awards within DOD under full and open competition have risen dramatically over the last two years. Statistics show that the Army has increased its percentage of dollars awarded competitively from 40.2 percent in FY82 to 46.9 percent in FY85. The Navy and Air Force have nearly doubled the number of dollars spent competitively while the Defense Logistics Agency (DLA) has reached a record level of 96.8 percent of all contracts awarded competitively [Ref. 5: p. 3]. However, according to the 1987 handbook, Management of the United States Government, there has been a substantial increase in the amount of time required for the Government to procure supplies and services to operate on a daily basis. To quote from the handbook,

> The acquisition process is so complex that product and service users sometimes do not get what they need when they need it. While the time required to process a specific acquisition varies with the procedures used and the type of product or services required, administrative lead-times of 27-37 weeks are not uncommon for competitively negotiated acquisitions in the $25,000-$5 Million range. Such long lead-times add to the uncertainty, risk, and expense and reduced productivity in agency programs. [Ref. 7: p. 87]

Additional problems that contribute to overall inefficiencies the Government is currently experiencing is the fact that a majority of

the dollars spent are still non-competitive (over 53% in 1985) and there is a general perception among contracting officers that their authority is being eroded due to the increase in the review and approval process [Ref. 7: p. 94].

The changes enumerated above that were brought about by CICA have contributed to increased PALT at ASO. A description of the effects on PALT will be presented in the last section of this chapter.

C. INITIATIVES CONCERNING UNDEFINITIZED CONTRACTUAL ACTIONS

The National Defense Authorization Act for Fiscal Year 1987 (1987 DOD Authorization Act) became the law of the land in November 1986. The Act authorizes appropriations for the military functions of DOD and mandates improvements in defense procurement procedures. Section 908 of the Act addresses specific requirements relating the undefinitized contractual actions (UCAs). Unpriced orders (UPOs) are categorized under the broad grouping of undefinitized contractual actions (UCAs) which includes letter contracts and unpriced change orders resulting from engineering change proposals and UPOs under basic ordering agreements (BOAs). All three of these contractual actions share a common characteristic, they are normally issued in advance of pricing and are therefore priced retrospectively or after-the-fact. FAR 16.703 describes a BOA as a written instrument of understanding between the Government and the contractor which contains appropriate contract terms and conditions. The order under the applicable

BOA terms and conditions represents the actual contract. BOAs do not normally specify individual line items, quantities or prices and the order normally indicates detail specifications or a statement of work. These orders can be priced retrospectively or they can be priced prospectively. A BOA can be structured to cover various time lengths from one to three years. A BOA is not a contract. FAR 16.703 further defines a BOA as follows:

> A Basic Ordering Agreement may be used to expedite contracting for uncertain requirements or supplies or services when specific items, quantities, and prices are not known at the time the agreement is executed, but a substantial number of requirements for the type of supplies or services covered by the agreement are anticipated to be purchased from the contractor. Under proper circumstances, the use of of these procedures can result in economies in ordering parts for equipment support by reducing administrative leadtime, inventory investment, and obsolescence due to design changes.

A BOA is reviewed each year and any revisions to it are accomplished by means of a bilateral agreement between the Government and the contractor rather that modifying the BOA itself in a retrospective fashion. The revised BOA applies only to orders issued after the effective date of the modification and cannot be modified by the order. Prior to issuing an order against the BOA, the contracting officer must either price the order in advance or issue a ceiling priced order, which limits the Government's liability, or he may issue a UPO with no ceiling. The FAR requires that if a ceiling priced order or UPO is issued, the contracting officer must ensure that one of the following conditions is met:

1. The BOA provides for adequate pricing early in the performance of the work; or

2. The need for the supplies or services is compelling and unusually urgent. In this situation, the contracting officer shall price the order as soon as practical.

The Navy Acquisition Regulations Supplement (NARSUP) requires that the agency contemplating the establishment of a BOA that includes provisions for price redetermination obtain written approval from the Office of the Secretary of the Navy. Each BOA will stipulate timeframes for the receipt of contractor proposals which usually fall no later than 60 days after the receipt of the orders. In addition, an agreed upon definitization date is stipulated. The NARSUP further stipulates that the definitization date shall not exceed either 180 days following the issuance of an order, or the completion of 40 percent of the work performed by the contractor, whichever occurs first.

At ASO, unpriced BOA orders have historically been the primary vehicle for the procurement of spare parts for two reasons: (1) a BOA allows for the placement of an order without a price proposal; and (2) less documentation is required to award and issue an order than is the case with a more traditional form of contract that is based on contractor proposals, field pricing reports, and negotiations. In essence, the BOA process contributes to the streamlining of the procurement process and results in a more timely and efficient response to fleet demands while reducing the administrative burden on procurement personnel. The use of

BOA orders and UPOs are recognized and legitimate methods of reducing PALT.

From a pure business standpoint undefinitized (retroactively priced) orders have a number of negative points including: (1) the Government is placed at a disadvantage in negotiating prices (as opposed to pricing contracts prospectively, or up-front); (2) the contractor's incentive to control costs is diminished; (3) unnecessary obligation of funds on the basis of excessively high pre-negotiation cost estimates and the Government's inability to use expired funds when they could have been used were it not for the inflated cost estimates; and (4) the tendency for contractors to realize a higher profit than the actual risk incurred would otherwise dictate. [Ref. 8]

Spurred by an audit conducted by the Naval Audit Service and published in December 1985 [Ref. 8] pointing to the above inefficiencies, the Director of Contracts and Business Management in the Office of the Assistant Secretary of the Navy (Shipbuilding and Logistics) (ASN (S&L)) issued a memorandum in October 1985 [Ref. 9] concerning UCAs and included a draft policy directive to all systems command headquarters and requested the agencies to provide feedback on the proposals. This was followed by a memorandum of guidance from Secretary Pyatt, ASN (S&L), in November 1985 [Ref. 10] concerning UCAs. The major thrust of Secretary Pyatt's memorandum is that UCAs have been used primarily to satisfy fleet requirements, maintain obligation plans and meet program schedules. The memorandum further indicates

that UCAs do not achieve cost control and directed the following actions:

1. Reduce the number of UCAs issued in FY86 by 20 percent and the outstanding dollar value by 30 percent compared to the end of FY85.

2. Review UCAs for possible deobligation of funds.

3. Require the receipt of an adequate price proposal prior to the issuance of a UCA in excess of $1 Million. Any exceptions are to be approved at flag/senior executive service levels.

4. Require that contractors propose and segregate costs by order.

5. Include a contract provision for the withholding of progress payments for delinquent proposal submission.

6. Disallow the inclusion of additional requirements to existing orders.

7. Prohibit the use of unpriced orders (UPOs) for contractor support services or in other instances where requirements cannot be adequately defined.

8. Include UCA definitization performance as a key Command indicator.

9. Negotiate profit rates commensurate with the level of the risk experienced by the contractor at the time of definitization.

Further guidance was provided by Secretary Pyatt in another memorandum issued in February 1986 [Ref. 11]. The memorandum indicates that the major reason that UCAs go past the scheduled definitization dates is because of the submission of inadequate proposals or the late submission of proposals. He also

states that in these instances the contractor continues to be funded through progress payments. The major thrust of the memorandum is to point out that when the contractor is delinquent in submitting definitization proposals, the contracting officer should withhold progress payments.

Secretary Pyatt issued another memorandum in August 1986 [Ref. 12] in which he indicated he was contemplating the establishment of an even more aggressive goal for FY87 as compared to the goals he established for FY86. The goal is based on a 50 percent reduction in dollar backlog compared to FY86.

In March 1986 Representative Wyden introduced a bill (H.R. 4461) that would severely limit the use of UCAs [Ref. 13]. The major intent of the bill was to limit the use of UCAs to "urgent needs" and for FY87, limits UCAs to 10 percent of the amount of funds appropriated for defense procurement. For FY88 and FY89, the percentage of UCAs is to be decreased to 5 percent.

Representative Wyden's bill, H.R. 4461, was referred to the House Armed Services Committee and was included in the FY87 DOD Auhorization Act (Section 908) which was passed in both Houses and signed into law in November 1986. The Act limits the use of funds for undefinitized contractual actions and requires that semi-annually during fiscal years 1987, 1988 and the first half of 1989, the service Secretaries report to Congress if the level of obligations for UCAs exceeds 10 percent of total obligations for their respective Service. In order to allow for an adequate "break-in period" to implement the provisions of the new requirement and to

avoid unnecessary delay in the issuance of UCAs for valid purposes, service Secretaries can exceed the 10% limitation during the first semi-annual period. The Act stipulates that if a service Secretary exceeds the 10 percent limitation for UCA obligations in any six-month period, the Secretary will be prohibited from further using UCAs.

Four categories of contracts are exempted from the limitations of the Act: (1) foreign military sales, (2) purchases less than $25,000, (3) special access programs (subject to special oversight procedures), and (4) Congressionally-mandated long-leadtime purchases. Additionally, the Act contains a waiver provision allowing the Secretary of Defense (SECDEF) to breach the 10 percent threshold for "urgent and compelling considerations relating to national security or public safety" by notifying Congress of such a waiver within 30 days of the issuance of the waiver. This would allow the services some flexibility to obligate funds for UCAs in "extreme emergency situations" without being restricted by the 10 percent ceiling.

.In addition to the general restrictions stated above, the Act sets forth the following specific requirements:

1. The requirement that a UCA be definitized within 180 days of the submission of a qualifying proposal.

2. Initial spares procurement is exempted from the requirement to definitize within 180 days of the submission of a qualifying proposal because the definitization of UCAs depends on the timely submission of contractor proposals.

3. A report to Congress by SECDEF not later than 1 July 1987 detailing the actions taken by DOD to effectively manage the issuance and timely definitization of UCAs. The reportis to include a determination on the feasibility of the 10 percent limitations effective 1 October 1987 as well as a recommendation for any modification or repeal of the limitation based on DOD's demonstrated ability to effectively manage UCAs. If no changes are required, the 10 percent limitation becomes effective on 1 October 1987. [Ref.14:p.49]

D. THE EFFECTS OF PROCUREMENT LEGISLATION ON ASO'S PROCUREMENT PROCESS

The statutes addressed in this chapter were enacted by Congress as a direct result of specific problems that were brought to the attention of the American public. While it is important for Congress to protect the vested interests of the taxpayer, it it questionable whether Congress' role should include the micro-management of the procurement process to the point of legislating the "fine print" on each contract let by a sanctioned Government procurement agent. When problems arise in a particular segment of the procurement process, it ought to be the particular Federal agency's responsibility to police its own actions and resolve the issues and make changes accordingly through the efforts of management in order to preclude the reoccurrence of the problems.

The mere process of change, regardless of the wisdom of its purposes, is inherently disruptive. All Federal agencies need time to assimilate the changes brought about by legislation and time for

the procurement system to adjust and stabilize. By one count the FAR has been amended 14 times since April 1984. The Defense Supplement to the FAR (DFARS) was amended 11 times during the same period, to say nothing of the numerous amendments that have been made to other agency supplements. With over 100 bills currently pending in Congress to make further changes to the acquisition regulations, it is easy to understand why Federal agencies need time to prepare for an even more difficult adjustment period. [Ref. 5: p. 13]

Since the passage of CICA there has been general agreement by procurement professionals that many of the Act's provisions have resulted in additions to the administrative processing time required to award a contract. At ASO this has clearly been the case. The Navy's initiatives that culminated in the inclusion of Section 908 in the FY87 DOD Authorization Act to reduce UCAs have also resulted in increased PALT at ASO. The researcher has learned from interviews with key individuals in the procurement process that the following changes required by CICA have contributed to increased PALT at ASO:

1. The preparation and processing of justifications and authorizations (J&As) for non-competitive procurements can increase PALT by as much as 180 days. J&As for procurements under $100,000 are approved by the branch head and procurements over $100,000 require concurrence of the Competition Advocate. ASO's Commanding Officer must approve those above $1 Million while the office of the Secretary approves those above the $10 Million threshold.

2. The stipulation for increased synopsis time in the CBD prior to releasing the solicitation and the increased synopsis period

after release of the solicitation has also increased the administrative process. At ASO the minimum total synopsis period is 52 days (15 days prior to solicitation, 30 days during solicitation, and a 7 day waiting period to ensure the synopsis request reaches the CBD in Chicago, IL).

3. The establishment of the Competition Advocate Directorate to review and approve all non-competitive sourcing procedures for procurements over $100,000 has added an average of six months to the administrative process and is due to complexities in some procurements as well as difficulties in qualifying second sources.

4. The requirement for contractors to provide certified cost or pricing data for procurements over $100,000 results in increased PALT because contractors tend to take more time to prepare proposals and they take every measure to ensure their proposals are accurate and complete. In addition, buyers and procurement analysts are also more careful about performing more thorough and complete price and cost analyses.

5. Increased competition has resulted in increased PALT because it can take an average of 90 days to develop and qualify firms which are competing for the first time. The number of pre-award surveys has also increased which necessitates additional human resources to review and analyze contractors' proposals.

6. Unanticipated offers (UAOs) can also increase PALT by one to eight months. UAOs occur when an unknown contractor responds to a CBD synopsis after solicitations have been mailed to interested contractors (the contractor who submits the UAO did not request a solicitation package). If the item in question is a critical, safety-of-flight item, the UAO source requires NAVAIR approval. The source for a non-critical item can be approved by the competition advocate's staff. If the source is approved during the period of the solicitation, ASO will then proceed with the procurement and request best and final offers from competing contractors. If the source is not certified during the solicitation period, the procurement is stopped until

the matter is resolved but is predicated on the stock position of the item. The IM is asked to review stock position; if there is sufficient stock on hand, the procurement is split to allow the initial solicitation process to continue. The remaining quantity is held in abeyance until the UAO source can be certified. If, however, the IM indicates the material is required without further delay, the procurement continues with the initial sources and the UAO source is advised that his proposal cannot be considered for the current procurement based on urgency of the material and his proposal will be reviewed. The course of action taken is driven by current stock position.

7. Field pricing reports from supporting organizations such as the Defense Contract Audit Agency (DCAA) and the Defense Contract Administration Service (DCAS) can take up to six months to be completed. Increased competition has caused increasingly more field pricing requests which these agencies are not able to process in a timely manner. A procurement analyst who requested anonymity indicated that often the field pricing reports are not as accurate as they might be and also indicated that this is so because the agencies feel pressured to respond quickly and therefore sacrifice accuracy for a more timely report. This creates additional work for the buyer who has to check the accuracy of field pricing reports.

8. Despite efforts to increase competition, it was learned that many prospective second sources don't respond to solicitations. Many small firms are accustomed to dealing with prime vendors to satisfy the Government's needs and would rather not undertake the additional burden of dealing directly with the Government bureaucracy. The net effect is a reduction in the number of possible competitors and often leads to sole-source procurements from prime vendors which increases PALT because of the J&A requirement.

9. The increased interest in "competition" by potential bidders has driven up the demand for bid sets and technical drawings (in microfiche form). It takes time and human effort to prepare, package and mail the solicitations to interested offerors. All too often, however, the number

of bids or proposals actually received is disproportionate to the number of solicitations mailed.

The recent initiatives dealing with UPOs have also had an effect on PALT at ASO. UPOs are typically used by ASO as admin-istrative tools to promptly place on order the requirements for aviation spares and the repair of repairables. Prior to the recent initiatives discussed earlier in this chapter, 75-80 percent of ASO's business consisted of UPOs. In FY86 the volume was reduced to 60 percent and in the current fiscal year the volume of UPOs cannot exceed 40 percent of ASO's total business and the obligation of funds for UPOs cannot exceed 10 percent of available funds.

These initiatives have changed the way ASO conducts business. The requirement to prospectively price orders has resulted in requirement dates being missed because buyers are sometimes not able to price the orders quickly enough and therefore contracts cannot be awarded in a timely manner. Backlogs in the buying sections have increased and it is common for the typical buyer to have a workload of 150-200 active PRs at any given time. The number of CBD synopses has increased (virtually every requirement is now synopsized) which has increased the workload and backlogs in the PSP branch. It is too early to evaluate the full impact of the UPO initiatives although it is clear that PALT will increase significantly until the backlog is worked off. PALT will taper off, but probably at a higher level than before the initiatives were put in place. What has typically been a 60-70

day PALT window in the PG section is expected to increase to 180-200 days, according to an experienced manager in the PG division at ASO.

E. SUMMARY

This chapter has described two of the major initiatives enacted in recent years by Congress and the Navy designed to improve the acquisition process. Starting with CICA through the Navy's actions to reduce the number of UCAs and the FY87 DOD Authorization Act which made the UCA initiatives applicable to all of DOD, it provided a perspective of the events that have contributed to increased PALT at ASO in recent years. The key provisions of these legislative mandates were discussed as were the essential requirements included in the statutes that affect PALT. The last section of the chapter described the specific changes required in ASO's conduct of the procurement process as a result of CICA and UCA initiatives.

IV. ANALYSIS OF VARIANCE (ANOVA) OF PALT STATISTICS

A. INTRODUCTION

The purpose of this chapter is to present an analysis of variance (ANOVA) of the statistical data provided by ASO. The primary focus of the analysis is to determine the extent to which unpriced order (UPO) initiatives have affected BOA PALT as well as the extent to which CICA initiatives have affected definitive contracts PALT. The analysis will include the researcher's interpretation of the results of the ANOVA. The data analyzed are the average monthly PALT for basic ordering agreements (BOAs) and definitive contracts covering the period from October 1984 through March 1987.

B. ANALYSIS OF VARIANCE (ANOVA) OF ASO'S PALT STATISTICS

Chapter III of this report presented a discussion of the acquisition environment and included a detailed account of the two recent legislative measures that have contributed the most to increased PALT at ASO. What follows is a presentation and analysis of the data provided by ASO which represent the total average PALT figures for BOA orders and "C" series (individual, definitive) contracts covering the period from October 1984 through March 1987.

Figures 3 and 4 are a graphic representation of the data. Figure 3 is a portrayal of PALT behavior for BOA orders during this period and shows that, in general, PALT has gradually increased, with some periods of decline, since October 1984. The two curves depicted in the graph show the separation of "Total PALT" and "PG PALT". This was done deliberately to segregate those actions which take place within the procurement division (PG) from the total. The total PALT figures do, however, include the time elements represented by the PG PALT curve. For example, in October 1984 average total PALT for BOAs was 127 days, 75 of which were accounted for in the PG branch, and so on through the entire graph. The same relationships are present in Figure 4 for contracts.

The two vertical lines in each graph were inserted to highlight the events that have contributed the most to increased PALT at ASO. In Figures 3 and 4 the vertical line labeled "APR 85" represents the passage of CICA while the line labeled "NOV 85" in Figure 3 represents the beginning of the Navy's initiatives relative to UPOs. The vertical line labeled "FEB 86" in Figure 4 represents the researcher's estimate of when the effects of CICA initiatives would be evident through either increased or decreased PALT, and is a way of showing the effects of CICA, "PALT time away". February 86 is a best estimate and was arrived at by projecting the total average pre-CICA PALT (316.41 days, or 10 months) forward and assumes that PALT would continue to exhibit the same behavior (an increase). In addition, the vertical lines serve

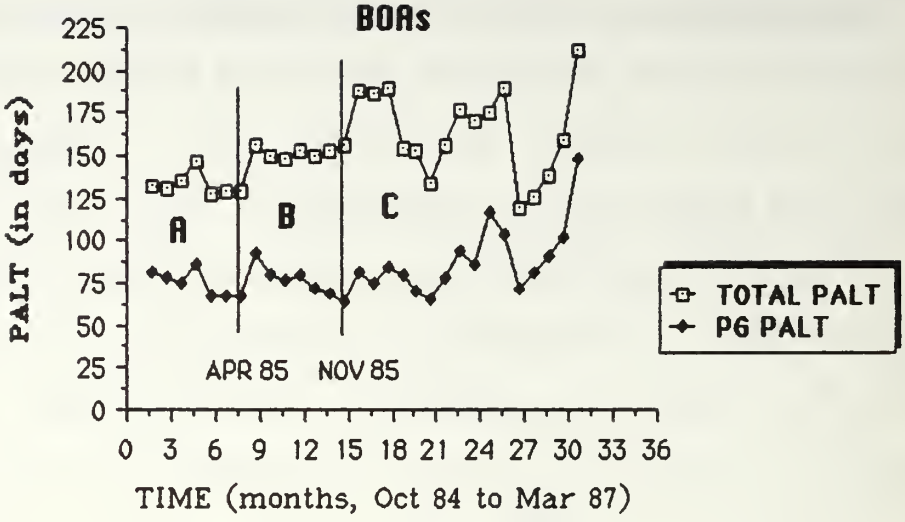

Figure 3. BOA Order PALT

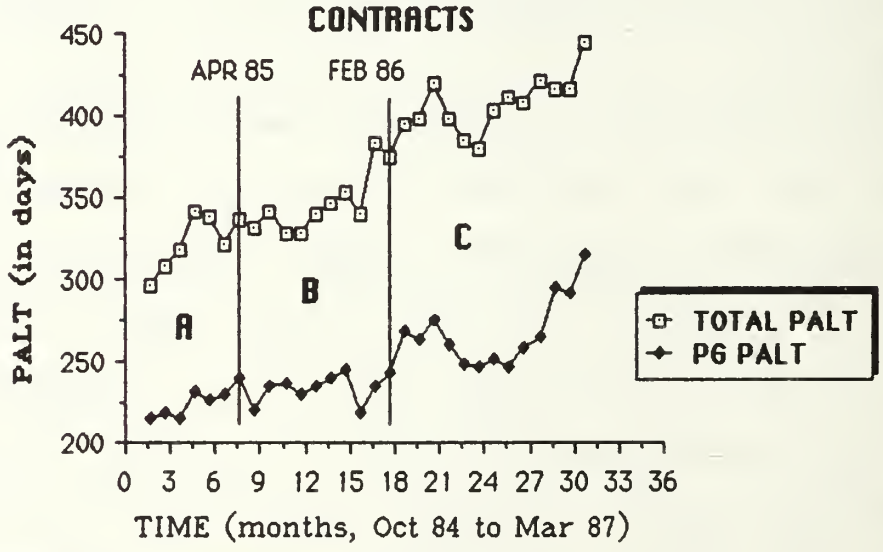

Figure 4. Contracts PALT

Source: Developed by researcher

to segregate the data into three distinct groups: A, B, and C; the data analysis which follows will be in terms of these groups. In Figure 3, Group A represents pre-CICA data, group B CICA and pre-UPO, and group C UPO; groups B and C combined represent post-CICA data. In Figure 4, group A represents pre-CICA data, group B CICA, and group C post-CICA effects on PALT; groups B and C combined represent post-CICA data.

While the graphs show a general upward trend and overall increase in PALT for both BOA orders and contracts, the researcher is interested in specifically analyzing the extent to which CICA and UPO initiatives have affected PALT. To that end, an analysis of variance (ANOVA) was performed to test if the different groups or populations (A, B, and C) have different means. Specifically, the researcher is interested in whether the differences in means are statistically significant. ANOVA is useful in answering the question, do all of the populations have the same mean? More important, do the population means differ any more than one would expect from just random variation?

Using the Minitab statistical computing system, the data were entered and the ANOVA test was run, with the following results. The means of the various groups are:

1. BOA Orders (Total PALT):

Group	Mean PALT
A	126.98
B	145.69
C	158.02
A+B	136.33
B+C	154.27
A+B+C	147.90

2. BOA Orders (PG PALT):

Group	Mean PALT
A	68.44
B	69.66
C	83.18
A+B	69.05
B+C	79.07
A+B+C	76.59

3. Contracts (Total PALT):

Group	Mean PALT
A	316.41
B	340.38
C	400.78
A+B	330.51
B+C	374.52
A+B+C	360.96

4. Contracts (PG PALT):

Group	Mean PALT
A	218.68
B	227.40
C	261.31
A+B	223.81
B+C	246.56
A+B+C	240.06

An analysis of these mean PALT statistics clearly shows that for both BOA orders and contracts, PALT has increased steadily from October 1984 to March 1987. Of particular significance is the mean PALT figure "B+C" for each of the four curves; this shows that PALT has increased significantly over the pre-CICA period, period A. The total mean PALT for BOA orders increased by 27.29 days from the pre-CICA period; PG PALT for BOA orders increased 10.63 days; Total PALT for contracts increased by 58.11 days; and PG PALT for contracts increased 27.88 days. On the surface these numbers appear straightforward, however, they represent averages of average figures provided by ASO and it is therefore difficult to determine how many contracts and BOA orders took a longer or shorter period of time to award. To more accurately analyze the mean PALT statistics, the ANOVA test was run to test the null hypothesis that the means of the populations are equal, that is, H_o: $mean_A = mean_B = mean_C$; by contradicting the null hypothesis, the research hypothesis H_a: $mean_A \neq mean_B \neq mean_C$

can be supported. In this manner it can be shown statistically that the mean average PALT has or has not increased.

The specific results of the ANOVA test for the null hypothesis (H_o) are summarized below. Minitab calculates the F-RATIO which is a test statistic that represents a value computed from the data that is used in determining whether or not the sample data are compatible with the null hypothesis. Generally, values of the test statistic that are very unlikely under the null hypothesis, but relatively more likely under the research hypothesis (H_a), tend to contradict the null hypothesis. The F-RATIO is a useful test statistic; if the statistic computed is large, the variation between the various groups of data is much greater than the variation due to random error and the null hypothesis that the average mean PALT of the groups of data are all equal can be rejected. How large the F-RATIO must be is determined by the critical value from an F-table with the desired alpha level or degree of confidence. For this particular test, the researcher used a 95 percent confidence level to compute the F-RATIOs. The results of the ANOVA test are as follows:

1. BOA Orders (Total PALT):

Group	Critical Value	F-RATIO
A vs. B	4.75	47.44
A+B vs. C	4.20	8.31
A vs. B+C	4.20	9.87
A vs. B vs. C	3.35	6.03

2. BOA Orders (PG PALT):

Group	Critical Value	F-RATIO
A vs. B	4.75	0.08
A+B vs. C	4.20	5.83
A vs. B+C	4.20	2.11
A vs. B vs. C	3.35	2.82

3. Contracts (Total PALT):

Group	Critical Value	F-RATIO
A vs. B	4.60	7.29
A+B vs. C	4.20	93.84
A vs. B+C	4.20	17.43
A vs. B vs. C	3.35	61.62

4. Contracts (PG PALT):

Group	Critical Value	F-RATIO
A vs. B	4.54	3.68
A+B vs. C	4.20	41.87
A vs. B+C	4.20	8.91
A vs. B vs. C	3.35	21.78

1. Analysis of PALT for BOA Orders

An analysis of the results reveals that in nearly every case, the null hypothesis of equality among the population means can be rejected and the research hypothesis that the means are not equal can be supported. For BOA orders, mean total PALT has increased in every group but most dramatically between groups A and B. An F-RATIO of 47.44 is significantly greater than the critical value 4.75, so the null hypothesis that $mean_A = mean_B$ can be rejected. The remainder of the BOA order total PALT

group comparisons show the same general results; while the F-RATIOs are not as high as the F-RATIO for A vs. B, the null hypothesis can be rejected since differences in the means are statistically significant. The results for BOA order mean PG PALT are interesting in that the F-RATIO for three of the four group comparisons is smaller that the critical values. For example, A vs. B, with an F-RATIO of 0.08 and a critical value of 4.75 indicates that events within A and B did not lead to differences in the actual means since the difference in the means are not statistically significant. The difference in actual means between A vs. B is 1.22 days and can be explained as the occurrence of random variation or random events and not the events themselves (in this case, the passage of CICA). For BOA orders, the Navy's initiatives to reduce UPOs appears to have had an effect on PALT, since the F-RATIO of 5.83 for A+B vs. C is higher than the critical value of 4.20, and the null hypothesis of equal means can be rejected.

It is interesting to note that, although PALT behavior for BOA orders has shown an overall increasing trend since October 84, it has shown periods of erratic behavior. Prior to the Navy's initiatives to reduce the number of UPOs, total PALT increased steadily from a pre-CICA level of 126.98 to 145.68 days after CICA (period B). As discussed earlier, this appears to be due to random variation and not the passage of CICA itself. Spurred by Secretary Pyatt's directive in November 85 (discussed in the previous chapter), total PALT for BOA orders rose sharply from 149.36 to

181.25 days. PALT remained steady through February 86 then began a decline to a low of 127.8 days in May 86. The researcher speculates that internal actions within ASO to reduce the number of UPOs accounted for the decline; by reducing the number of new UPOs the procurement workforce was able to concentrate on a fewer number of orders and issue them more quickly. After May 86, total PALT for BOAs steadily increased to 183.57 days in October 86. PG PALT for BOAs also increased from 59.59 to 97.79 days in the same period. This increase can be attributed to UPOs being replaced by priced orders which take longer to definitize. From October to November 86 both total and PG PALT showed a significant decline; total PALT was reduced to 112.98 days and PG PALT decreased to 68.89 days. This decline can be attributed to the normal conduct of business associated with the beginning of a new fiscal year. The end of the fiscal year is characterized by a major effort to clear the pipeline and award all remaining competitive contracts thus enhancing the "numbers" for the year's competition goals. During the last two months of the fiscal year pending sole-source buys and UPOs are dollar constrained and are therefore awarded early in the new fiscal year.

In October and November 86, the previous year's competition pipeline having been cleared, ASO had increased flexibility in issuing UPOs since dollar constraints don't become a factor until later in the fiscal year. Additionally, sole-source buys remaining at the end of the fiscal year can be awarded with relative ease. Issuing UPOs and awarding sole-source

procurements takes considerably less time to accomplish which accounts for the significant reduction in PALT in October, from 183.57 to 112.98 days. Another reason for the decline in PALT in October 86 was the impending reorganization of the PG branch which was designed to reduce the ratio of buyers to supervisors and therefore increase buyer efficiency; the reorganization was also intended to align the buying sections by weapon system in a similar manner as the IMs in the Weapons Management (WM) Branch are organized. This functional reorganization was also designed to enhance the working relationship between the IMs and the respective weapon system buyers and thus reduce the redundancy which existed prior to the reorganization of PG. Prior to the reorganization it was not uncommon for several buyers to deal with a single vendor for similar parts; reorganization has resulted in a more efficient use of human resources within PG by having the same buyer(s) deal with the same vendors on a repetitive basis.

After the passage of the DOD Authorization Act in November 86, PALT began to increase because increasing numbers of BOA orders were required to be prospectively priced, as discussed earlier. In December 86, total and PG PALT began an upward surge to new highs of 205.73 and 141.5 respectively. The researcher learned that a major contributing factor to the rise in PALT was procurement analysts having to learn new pricing techniques and procedures for BOA orders. UPO initiatives resulted in additional pressures being exerted on the procurement analysts

because of the requirement for prospective pricing. Prospective pricing increased PALT primarily because the required DCAA audits and field pricing reviews can take as long as 60 days to complete. In addition, procurement analysts are faced with conducting negotiations with contractors based on cost estimates (as opposed to actual costs incurred under a UPO scenario); this often leads to discrepancies between the DCAA audits and contractor proposals and ultimately results in additional time for the procurement analysts to resolve these differences and arrive at a fair and reasonable contract price. Procurement experts at ASO speculate that PALT for BOA orders will continue its upward trend for the foreseeable future until the procurement workforce is trained to adequately deal with UPO initiatives and a new way of doing business. Since 70% of ASO's past business has been through the use of BOAs, it is clear that the FY87 DOD Authorization Act will have a significant impact on PALT for some time but will level off once the procurement workforce has had sufficient time to learn new procedures as well as the opportunity to work the backlogs created by these initiatives. In summary, the critical factor for BOA orders appears to be variability in PALT even though mean PALT increased from group A to C. Although mean PALT is statistically significant, it is not very strong.

2. Analysis of PALT for contracts

The results of the ANOVA test for contracts also show that both total and PG PALT have steadily increased. In every case except one, the null hypothesis of equality among the population

means can be rejected and the research hypothesis that the means are not equal can be supported. The one exception is the ANOVA between group A and B for PG PALT. In all other cases, the research hypothesis can be statistically supported since the F-RATIOs are larger than their corresponding critical values. In the case of group A vs. B for PG PALT, the F-RATIO of 3.68 is less than the critical value of 4.54. The true average means are 218.68 and 228.00 respectively, a difference of 9.32 days. The statistical difference between these means can be attributed to random variation and not necessarily the passage of CICA. This is plausible since the effects of CICA would not be seen immediately but rather in later periods. As was explained earlier, the researcher estimated that the effects of CICA would not be evident until "PALT time away", which was projected to be 10 months after the passage of CICA. Using 10 months as the adjustment factor, the effect on PALT from awarding new contracts after the passage of CICA is shown in Figure 4 by the vertical line labeled "FEB 86". It can be seen clearly that 10 months after the passage of CICA, February 86, total PALT increased from 329.71 to 368.19 days. Similarly, PG PALT increased from 232.95 to 237.36 days. This small increase in mean PG PALT can be explained by the fact that CICA's mandate for the establishment of a competition advocate initially caused the most "growing pains" and contributed the most to the increase in total PALT; as described in Chapter II, the CA loop is outside of PG's realm of responsibility. As is the case with BOA orders, it is interesting to note that both total and

PG PALT have shown erratic behavior since the beginning of the Navy's initiatives to reduce UPOs in November 85, although the behavior was not as extreme.

In summary, the primary issue with PALT for contracts is a significant increase in mean PALT with variability nearly equal to that of BOA orders after November 85. There appears to be a difference in how BOA order and contract PALT react to CICA and UPO initiatives. BOA orders show an increase in variability resulting from UPO initiatives while contracts show a steady increase in mean PALT. Total and PG PALT for contracts show a predictable increase which is the result of more consistency in the application of CICA initiatives as compared to BOAs.

C. SUMMARY

This chapter has presented an analysis of variance (ANOVA) of ASO's average monthly PALT statistics for the period covering October 1984 through March 1987. The results of the analysis show that for BOA orders, mean PALT has increased since the passage of CICA. More important, the Navy's initiatives to reduce the number of UPOs appears to have had an effect on BOA PALT. Although BOA PALT has shown an increasing trend, it exhibited erratic behavior since the start of UPO initiatives. The increase in BOA PALT can be attributed in part to the UPO initiatives which resulted in prospective pricing and definitization of BOA orders which increases the administrative burden on procurement personnel. After the passage of the FY87 DOD Authorization Act in

November 86, PALT began an upward surge due to increasing numbers of up-front definitization actions following an administrative effort in August and September 1986 to award competitive contracts and meet the competition goals as well as a major internal reorganization within the Procurement Directorate designed to improve the internal management of contracts.

PALT for contracts showed a significant increase as a result of CICA. Using 10 months as an adjustment factor to estimate when the initial effects of CICA would be evident, PALT showed a steady increase. While total PALT and PG PALT both increased, the increase in total PALT was more significant due to the initial "growing pains" associated with the establishment of the Competition Advocate Directorate as well as other CICAinitiatives.

V. ANALYSIS OF THE CONTRACT TYPES AND METHODS

A. INTRODUCTION

In the course of conducting research for this thesis the researcher learned that the principal contracting methods/techniques used by ASO for the procurement of spare parts are competitive procurement, sole source negotiation, and priced and unpriced orders under BOAs. While there are several methods available from which to choose, management feels that in the existing acquisition environment the methods mentioned above are best suited for meeting ASO's needs and goals.

In order to determine whether ASO is taking full advantage of the various contract types and methods at their disposal, the researcher conducted a review of the available methods with a view toward recommending feasible alternatives. Given the mandates for increased competition and a reduction in the number of UPOs imposed by CICA and the FY87 DOD Authorization Act, the choices become more limited. However, the analysis serves the purpose of exploring possible combinations of contract types and methods that might offer feasible alternatives to procurement personnel at ASO.

B. DESCRIPTION OF AVAILABLE CONTRACT TYPES

What follows is an abbreviated description of the various contract types contained in FAR Part 16 and the conditions under which they may be selected for use. Following this, a similar description of the various contracting methods contained in FAR Parts 14, 15, and 17 will be presented. This discussion will culminate in "decision matrices" used by the researcher to evaluate the most appropriate combinations of contract types that can be used by procurement personnel at ASO. The various contract types are:

1. Fixed-price (FP) Contracts.

Taken as a whole, FP contracts contain a fairly complex structure of potential pricing arrangements. They provide for a firm price or, in appropriate cases, an adjustable price. FP contracts providing for an adjustable price may include a ceiling price, a target price (including target cost), or both. Unless otherwise specified in the contract, the ceiling price or target price is subject to adjustment only by operation of contract clauses providing for equitable adjustment or other revision of the contract price under stated circumstances. Under the FP arrangement, the contract price is limited by the allocation of risk between the parties. The degree of shared risk between the parties is allocated according to the following four basic types of FP pricing arrangements:

a. Firm-fixed-price (FFP).

Under an FFP arrangement, the contractor bears all of the risk of performance; he guarantees successful performance of contract requirements including accomplishment by a specified delivery date. The contractor is financially responsible for successful performance without any right to change in price. He has the incentive to perform efficiently and secure as profit 100 percent of the costs saved, if less than anticipated costs. The Government is obligated to pay the contract price regardless of actual costs of performance and therefore prefers the FFP arrangement over all others since it is able to plan for the timely delivery of material at a cost which has been defined in the contract.

b. Fixed-price Incentive (FPI).

An FPI contract provides for adjusting profit and establishing the final contract price by a formula based on the relationship of final negotiated total cost to total target cost. The final price is subject to a price ceiling which is negotiated at the outset. Under an FPI contract the contractor is paid more profit if performance is completed at a cost below the target cost and is paid less profit if the cost at completion exceeds the agreed upon target cost. The two types of FPI contracts are:

(1) Fixed-price Incentive Firm (FPIF).

The FPIF arrangement specifies a target cost, a target profit, a price ceiling, and a profit adjustment formula, all of which are negotiated at the outset. The price ceiling is the

maximum the contractor will be paid. At the completion of performance, the final cost is negotiated and the final price is established using the formula. If the final cost is less than target cost, the contractor earns a higher profit; if final cost is morethan target cost, less profit is earned. If the final negotiated cost exceeds the price ceiling, the contractor absorbs the difference as a loss.

(2) Fixed-price Incentive (Successive Targets) (FPIS).

In the FPIS arrangement, the parties negotiate at the outset an initial target profit, a price ceiling, a formula for fixing the firm target profit, and a production point at which the formula will be applied. The initial formula also provides for a ceiling and floor on the firm target profit. When the production point for applying the formula is reached, the firm target cost is then negotiated and the firm target profit is automatically determined in accordance with the formula. At this point, two alternatives are possible: (1) the negotiation of an FFP arrangement or (2) the negotiation of an FPIF contract.

FPI arrangements are designed to encourage contractors to improve their contract performance in the area of cost, quality performance and delivery schedule by harnessing the profit motive by providing the contractor with a dollar incentive to reduce costs, improve end-item performance, and/or speed up delivery. An FPI contract is appropriate when: (1) an FFP contract is not suitable; (2) when the nature of the procurement is such that the contractor's assumption of a degree of cost

responsibility will provide a profit incentive for effective cost control and performance; and (3) if the contract also includes incentives on technical performance and/or delivery, the performance requirements provide a reasonable opportunity for the incentives to have a meaningful impact on the contractor's management of the work.

c. Fixed-price Redeterminable (FPR).

The FPR arrangement avoids the inclusion of a sharing formula, yet leaves the final negotiation of price until performance of work has proceeded to the point at which costs of performance are well enough known to predict (and negotiate) the final cost and price necessary for completion of work. The redetermined price is set forth in the contract when negotiated. The two types of FPR contracts are:

(1) Fixed-price Redeterminable (Prospective) (FPRP).

The FPRP is a series of two or more FFP contracts that are negotiated at fixed times during the performance of the contract. This allows for gathering more cost data as more experience is encountered in the procurement. This contract type can be used in acquisitions of quantity production for which it is possible to negotiate a fair and reasonable FFP for an initial period, but not for subsequent periods of performance.

(2) Fixed-price Redeterminable (Retroactive) (FPRR).

The FPRR contract provides for adjustment of the contract price after the work has been done. The parties determine the degree of cost responsibility at the final negotiation

of price, and price is based on a subjective determination of the manner in which the contract has been performed. Because of this subjective evaluation of profit, the contractor does not have a positive incentive to control costs. The FPRR contract is appropriate for research and development (R&D) contracts of $100,000 or less when it is established at the outset that a fair and reasonable FFP cannot be negotiated and that the amount involved and short performance period make the use of any fixed-price contract type impracticable.

d. Fixed-price with Economic Price Adjustment (FP-EPA)

An FP-EPA arrangement is appropriate in those situations where a high degree of economic uncertainty exists during an extended period of contract performance and is designed to protect both parties against significant economic fluctuations in labor or material costs or to provide for contract price adjustments in the event of changes in the contractor's established prices.

e. Firm-fixed-price, Level-of-effort Term Contracts (FFPLET).

The FFPLET arrangement requires that the contractor provide a specified level of effort, over a stated period of time, on work that can be stated only in general terms. This arrangement also calls for the Government to pay the contractor a fixed dollar amount based on the effort expended rather than on the results achieved. The FFPLET contract is normally limited to research undertakings of limited scope in which progress toward a technological achievement, not completion, is sought.

2. Cost-Reimbursement Contracts.

Unlike FP-type contracts, cost-reimbursement contracts provide for payment of allowable incurred costs, to the extent prescribed in the contract. An estimate of total cost is established for the purpose of obligating funds and establishing a ceiling that the contractor may not exceed (except at his own risk) without the approval of the contracting officer. Cost-reimbursement contracts are suitable for use only when uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of FP contract. The principal feature of cost-type contracts is the method of payment: the Government reimburses the contractor for his costs, subject to a cost limitation clause in the contract. Beyond that, the contractor need not continue work unless additional funds are provided and the contracting officer authorizes continued performance. The contractor promises only his best efforts and delivery and performance are therefore uncertain. The Government assumes all of the financial risk in every cost-type contract except the cost sharing contract where the risk is divided between the parties. The types of cost-reimbursement contracts are:

a. Cost-no-fee (C-NF).

The C-NF contract is used primarily for research undertakings in which a university or other nonprofit educational institution is the performing party. The contract provides no sum of money over and above the agreed-upon allowable costs of performance.

b. Cost-plus-fixed-fee (CPFF).

This type of contract provides for payment to the contractor of a negotiated fee that is fixed at the inception of the contract. The fixed fee does not vary with actual cost, but may be adjusted as a result of changes in the work to be performed. The CPFF contract permits contracting for efforts that might otherwise present too great a risk to contractors, but it provides the contractor only a minimum incentive to control costs. The Government agrees to reimburse the contractor for all allocable, allowable, and reasonable costs incurred during contract performance, as well as a fee (profit) for doing the work.

c. Cost-plus-incentive-fee (CPIF).

The CPIF arrangement provides for an initially negotiated fee to be adjusted later by a formula based on the relationship of total allowable costs to total target costs. It specifies a target cost, a target fee, minimum and maximum fees, and a fee adjustment formula. After contract performance, the fee payable to the contractor is determined in accordance with the formula. The formula provides, within limits, for increases in fee above target fee when total allowable costs are less than target costs, and decreases in the fee below target fee when total allowable costs exceed target costs. This increase or decrease is intended to provide an incentive for the contractor to manage the contract effectively. When total allowable cost is greater than or less than the range of costs within which the fee-adjustment

formula operates, the contractor is paid total allowable costs, plus the minimum or maximum fee.

The CPIF contract is appropriate for development and test programs when a cost-reimbursement contract is necessary (eg., when uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of FP contract) and a target cost and a fee adjustment formula can be negotiated that are likely to motivate the contractor to manage effectively.

d. Cost-plus-award-fee (CPAF).

The CPAF contract contains special fee provisions that provides a means of applying incentives in contracts which are not susceptible to finite measurements of performance necessary for structuring incentive contracts. It provides for a fee consisting of of a base amount fixed at the inception of the contract and an award amount that the contractor may earn in whole or in part during performance and that is sufficient to provide motivation for excellence in such areas as quality, timeliness, technical ingenuity, and cost-effective management. The amount of the fee is based on a unilateral, judgmental evaluation of the contractor's performance in terms of the criteria stated in the contract.

3. Indefinite-delivery contracts (IDC).

Indefinite-delivery contracts (IDCs) are appropriate when the exact times and/or quantities of future deliveries are not known at the time of contract award. The three types of IDCs are: (1) definite-quantity contracts; (2) requirements contracts;

and (3) indefinite-quantity contracts. The characteristics of these IDCs are:

a. Definite-quantity contracts (DQC).

DQC contracts provide for delivery of a definite quantity of specific supplies for a fixed period, with deliveries to be scheduled at designated locations upon order. They can be used when it can be determined in advance that a definite quantity of supplies will be required during the contract period and the supplies are regularly available or will be available after a short lead time.

b. Requirements contracts.

A requirements contract provides for filling all actual purchase requirements of designated Government activities for specific supplies during a specified contract period, with deliveries to be scheduled by placing orders with the contractor.The contracting officer states a realistic estimated total quantity in the solicitation and resulting contract although it may not be based on stable or normal conditions affecting requirements. The contract states the maximum limit of the contractor's obligation to deliver and the Government's obligation to order as well as maximum and minimum quantities the Government may order under each individual order or during a specified period of time. A requirements contract can be used when the Government anticipated recurring requirements but cannot predetermine the precise quantities of supplies needed, and is appropriate for commercial products or commercial-type products. Commercial

items are items sold or traded to the general public in the course of normal business operations at prices based on established catalog or market prices while commercial-type products are commercial products modified to meet some Government-peculiar physical requirement or addition or are otherwise identified differently from their commercial counterparts.

c. Indefinite-quantity contracts (IQC).

IQCs provide for an indefinite quantity, within stated limits, of specific supplies to be furnished during a fixed period, with deliveries to be scheduled by placing orders with the contractor. The contract requires the Government to order and the contractor to furnish at least a stated minimum quantity of supplies, and the contractor to furnish any additional quantities, if ordered, not to exceed a stated maximum. For the contract to be binding, the minimum quantity must be more than a nominal quantity, but should not exceed the amount that the Government is fairly certain to order.

4. Time-And-Materials, Labor-Hour, and Letter Contracts.

Time-and-materials contracts provide for acquiring supplies on the basis of: (1) direct labor hours at specified fixed hourly rates that include wages, overhead, general and administrative (G&A) expenses, and profit; and (2) materials at cost, including, if appropriate material handling costs as part of material costs. Since this contract type provides no positive profit incentive to the contractor for cost control or labor efficiency, Government surveillance of contractor performance is required. A

time-and-materials contract can be used only after the contracting officer executes a J&A that no other contract type is suitable and only if the contract includes a ceiling price that the contractor exceeds at his own risk.

Labor-hour contracts are a variation of the time-and-materials contract and differ only in that materials are not supplied by the contractor. Labor-hour contracts can be used only when it is not possible at the time of placing the contract to estimate accurately the extent or duration of the work or to anticipate costs with any reasonable degree of confidence.

Letter contracts are written preliminary contractual instruments that authorize the contractor to begin immediately manufacturing supplies or performing services. They may be used (1) when the Government's interests demand that the contractor be given a binding commitment so that work can start immediately; and (2) when negotiating a definitive contract is not possible in sufficient time to meet the requirement. When a letter contract is awarded based on price competition, the contracting officer must include an overall price ceiling in the contract. The contract also must include a definitization schedule (within 180 days after the date of the letter contract or before completion of 40 percent of the work to be performed, whichever occurs first) as well as a limitation of government liability clause that does not exceed 50 percent of the estimated cost of the definitive contract unless approved in advance by the official that authorized the

letter contract. A letter contract also requires a J&A that no other contract type is suitable.

5. Agreements.

a. Basic agreements (BA).

A basic agreement (BA) is a written instrument of understanding, negotiated between the parties, that (1) contains contract clauses applying to future contracts between the parties during its term; and (2) contemplates separate future contracts that will incorporate by reference or attachment the required and applicable clauses agreed upon in the basic agreement. A basic agreement is not a contract. A basic agreement should be used when a substantial number of separate contracts may be awarded to a contractor during a particular period and significant recurring negotiating problems have been experienced with the contractor. BAs may be used with negotiated FP or cost-reimbursement contracts and the agreement must contain a provision for discontinuing its future applicability upon 30 days' written notice by either party. A basic agreement is reviewed annually and is revised as necessary and is incorporated into a contract by specific reference or by attachment.

b. Basic ordering agreements (BOAs).

The details of BOA orders were presented in Chapter III of this thesis; to review, a BOA is a written instrument of understanding that contains: (1) terms and clauses applying to future contracts (orders) between the parties during its term; (2) a description, as specific as practicable, of supplies or services to

be provided; and (3) methods for pricing, issuing, and delivering future orders under the BOA. A BOA is not a contract. A BOA may be used to expedite contracting for uncertain requirements for supplies or services when specific items, quantities, and prices are not known at the time of the agreement is executed, but a substantial number of requirements for the supplies or services under the agreement are anticipated to be purchased from the contractor.

C. DESCRIPTION OF AVAILABLE CONTRACTING METHODS

1. Sealed bids.

The sealed bid method of procurement was described in detail in Chapter II of this thesis. To summarize, sealed bidding is a method of procurement that employs competitive bids and is used under the following conditions: (1) time permits the solicitation, submission, and evaluation of sealed bids; (2) the award will be made on the basis of price and other price-related factors; (3) it is not necessary to conduct discussions with offerors about their bids; and (4) there is reasonable expectation of receiving more than one sealed bid. Under the mandate for full and open competition required by CICA, all responsible sources are permitted to compete.

2. Two-step sealed bidding.

Two-step sealed bidding is a combination of competitive procedures designed to obtain the benefits of sealed bidding when adequate specifications are not available. Its main objective is to

permit the development of a sufficiently descriptive and not unduly restrictive statement of the Government's requirements, including an adequate technical data package, so that subsequent acquisitions may be made by conventional sealed bidding. The two-step sealed bid method is especially useful in procurements requiring technical proposals, particularly those for complex items.

The first step consists of the request for, submission, evaluation and (if necessary) discussion of a technical proposal. No pricing is involved, and the objective is to determine the acceptability of the supplies or services offered. Questions relating to technical requirements are clarified and while contractor responsibility is not resolved, conformity to the technical requirements is evaluated.

The second step involves the submission of sealed bids by those contractors who submitted acceptable technical proposals in step one. Bids submitted are evaluated and contract award is made using sealed bid procedures.

3. Competitive proposals.

The competitive proposal method was discussed in detail in Chapter II of this thesis. To summarize, a competitive proposal is used to discuss and negotiate between the parties and allows for offerors to submit proposals for the purpose of "bargaining" for such things as price, schedule, technical requirements, type of contract, or other terms of the proposed contract. The essential elements of the competitive proposal method include: (1) price or cost to the Government are an evaluation factor in every source

selection while other factors may include cost realism, technical excellence, management capability, personnel qualifications, experience, past performance, schedule, and any other relevant factors; and (2) while the lowest price or lowest total cost to the Government is normally the deciding factor in source selection, in certain acquisitions the Government may select the source whose proposal offers the greatest value in terms of performance and other factors. Under the mandate for full and open competition required by CICA, all responsible sources are permitted to compete.

4. Multiyear contracting (MYC).

MYCs are special contracts covering more that 1-year's but not more than 5-year's requirements, unless otherwise authorized by statute. Total contract quantities and annual quantities are planned for a particular level and type of funding as displayed in a current 5-year development plan. Each program year is annually budgeted and funded and, at the time of award, funds need only to have been appropriated for the first year. The contractor is protected against loss resulting from cancellation of the contract by contract provisions which allow reimbursement of costs included in the cancellation ceiling.

The use of MYC is generally encouraged to take advantage of (1) lower costs; (2) enhancement of standardization; (3) reduction of administrative burdens in the placement and administration of contracts; (4) substantial continuity of production or performance, thus avoiding start-up costs, pre-production testing costs, and phase-out costs; (5) Stabilization of

the contractor's work force; (6) avoidance of the need for establishing and "proving out" quality control techniques and procedures for a new contractor each year; (7) broadening the competitive base with the opportunity for participation by firms not otherwise willing or able to compete for lesser quantities, particularly in cases involving high start-up costs; and (8) provide incentives to contractors to improve productivity through investment in capital facilities, equipment, and advanced technology.

5. Options.

The use of options is a means by which the Government exercises the unilateral right in a contract, for a specified time, to purchase additional supplies or services called for by the contract, or may extend the term of the contract. Options may be included in contracts when it is in the Government's interest. Conditions under which options are not appropriate when the contracting officer determines that the foreseeable requirements involve: (1) minimum economic quantities (quantities large enough to permit the recovery of start-up costs and the production of the required supplies at a reasonable price); and (2) delivery requirements far enough into the future to permit competitive acquisition, production, and delivery.

The contracting officer may not use options if: (1) the supplies or services are readily available in the open market; (2) the contractor will incur undue risks; (3) an indefinite quantity or requirements contract is appropriate (except that options may be

used to extend the terms of such contracts); (4) market prices for the supplies or services involved are likely to change substantially; or (5) the option represents known firm requirements for which funds are available unless: (a) the basic quantity is a learning or testing quantity; and (b) competition for the option is impracticable once the initial contract is awarded.

6. Sole source negotiation.

Sole source negotiation (non-competitive procurement) is an approved contracting method which the Government may use for contracting without providing for full and open competition, The seven conditions under which sole source procurement may be used were detailed in Chapter III of this thesis. A contract awarded under this method must cite the specific authority (U.S. Code) under which it was awarded. The contracting officer is required to solicit offers from as many potential sources as is practicable under the circumstances, and the use of sealed bids or competitive proposals, as appropriate, are the prescribed methods of procurement, as described in FAR Part 6. The agency must also obtain approval for the sole source procurement through the use of a J&A.

D. ANALYSIS OF CONTRACT TYPES AND METHODS

Having described the various contract types and methods available to procurement personnel at ASO, the task becomes one of analyzing the alternatives in order to arrive at the most feasible contracting techniques that can be used for the procurement of

spare parts at ASO. Figure 5 is a decision matrix developed by the researcher and was used to evaluate the contract types against the needs and concerns expressed by procurement managers at ASO in their selection of the appropriate contract type. To indicate favorable consideration of a contract type for the needs or concerns, a "+" was inserted; unfavorable consideration is indicated by a "−", and a neutral position is shown by a "o". In addition, asterisks "*" appearing under the "regulatory" concern column indicate that a specific FAR passage or other regulation either precludes or prohibits the use of that particular contract type (regardless of the researcher's evaluation marks); for example, an FFPLET contract is appropriate only for conducting an investigation or study in a specific research and development (R&D) area. An "#" in the "regulatory" concern column indicates that this is the preferred contracting method within DOD. All other contract types are approved for use when circumstances warrant, but the FFP is preferred over all other methods. In choosing the best contracting types and methods to use various factors have to be considered, the most important of which is statutory guidance. While the FAR does not specifically address the procurement of spare parts, the DOD FAR Supplement states that:

> ...parts must be acquired so as to assure the requisite safe, dependable, and effective operation of the equipment. Where it is feasible to do so without impairing this assurance, parts should be acquired on a full and open competitive basis....

Contract Type	Urgency of Need	Best Dollar Value	Quality	Detailed Performance Specs.	Increased Competition	Reduced Obsolescence	Reduced Admin Burden	Regulatory
FFP	+	+	+	+	+	+	+	#
FPI	+	o	+	+	+	+	o	
FPIF	+	o	+	+	+	+	o	
FPIS	o	o	+	+	+	o	-	
FPR	o	-	o	-	-	-	-	
FPRP	o	-	o	-	-	-	-	
FPRR	o	-	o	o	+	o	-	
FP-EPA	o	-	o	o	+	o	-	
FFPLET	o	+	o	-	+	-	-	*
C-NF	o	+	o	-	+	-	o	*
CPFF	o	-	-	-	o	-	-	*
CPIF	o	-	-	o	+	-	-	*
CPAF	o	-	-	-	+	-	-	
DQC	+	+	+	+	+	o	+	
REQMTS	+	+	+	+	+	o	+	
IQC	+	+	+	+	+	+	+	
TIME/MATLS	-	-	-	-	+	o	-	
LABOR-HR	-	-	-	-	-	-	-	
LETTER	+	-	+	+	+	+	+	
BA	+	-	+	+	+	+	+	
BOA	+	-	+	+	+	+	+	

Figure 5. Contract Type Decision Matrix

Source: Developed by researcher

However, where this assurance can be had only if the parts are acquired from the original manufacturer of the equipment or his supplier, the acquisition should be restricted accordingly.

Parts that are fully identified and can be obtained from a number of known sources, and parts for which fully adequate manufacturing drawings and any other needed data are available with the right to use for acquisition purposes are to be acquired on a competitive basis. In general, such parts are of a standard design and configuration...and include individual items that are susceptible of separate acquisition, such as resistors, spark plugs, electron tubes, or other parts having commercial equivalents.

Parts not within the scope of the paragraph above generally should be procured (either directly or indirectly) only from sources that have satisfactorily manufactured or furnished such parts in the past, unless fully adequate data, test results, and quality assurance procedures, are available with the right to use for procurement purposes to assure the requisite reliability and interchangeability of the parts, and acquisition on a competitive basis would be consistent with the assurance of the requisite safe, dependable, and effective operation of the equipment. In assessing this assurance, the nature and function of the equipment of which the part is needed should be considered. Parts qualifying under this criteria are normally sole source or source controlled parts which exclusively provide the performance, installation and interchangeability characteristics required for specific critical applications... [Ref. 15: Part 17.7203]

An analysis of Figure 5 shows that by default the firm-fixed price (FFP) contract is the most logical and feasible alternative, for several reasons. The nature of replenishment spare parts is such that they have a stable design, a price history due to repetitive procurement, adequate price competition, a history of prior purchases, available cost or pricing information that can be

derived from technical drawings, and there are very few uncertainties associated with them because of stable design.

Another feasible alternative is the fixed-price incentive (FPI) contract, specifically the FPIF arrangement. An FPI arrangement is appropriate for use when an FFP contract is not suitable; it can also be used when the nature of the supplies are such that the contractor's assumption of a degree of cost responsibility will provide a positive incentive for effective cost control and performance. In addition, the contractor's technical performance and/or delivery can be incentivized to have a meaningful impact on his management of the work. Because the profit varies inversely with the cost, the FPIF provides a positive, calculable profit incentive for the contractor to control costs. Although it is a feasible alternative, however, the FPI is used only when the agency prepares a statement indicating that the FPI arrangement is likely to be less costly than any other contract type or when it is impractical to obtain the needed supplies of the kind or quality without its use. Incentive contracts require considerable administrative cost and effort because of the requirement for cost and technical reviews and assessment of status of the incentive. FPI contracts, therefore, are especially appropriate for use when making high dollar value procurements

The indefinite delivery contract (IDC), including DQCs, requirements, and IQCs, also provides a feasible alternative from the standpoint that it allows for a minimum level of stocks to be maintained, the contractor can ship material directly to users (the

fleet), and the Government is only obligated to the minimum quantity specified in the contract. The IDC arrangement has strong benefits from the inventory control and financial management perspectives.

Of the remaining contract types, BOAs offer another extremely feasible alternative primarily because of the reduced administrative burden, the improved ability of the agency to obligate available funds, and the ability of the agency to obtain needed material quickly to satisfy emergent fleet requirements and prevent material stock-out prior to the receipt of material competitively procured. BOAs can also be used for competitive procurements; if a contractor successfully negotiates a fair and reasonable price through the competitive proposal process, an order may be issued to contract for the requirements if a BOA currently exists with the appropriate terms and conditions [Ref. 16].

An analysis of Figure 6 reveals once again that by default, sealed bidding, two-step sealed bidding, and competitive negotiation are the most appropriate procurement methods due to the mandates imposed by CICA. The asterisks (*) in the "regulatory" concern column indicates that, for sealed bidding, two-step sealed bidding, and competitive negotiation, statutory regulations mandate the use of these methods when circumstances dictate. Under the current Congressionally-mandated rules in CICA, full and open competition is the by-word for the solicitation and award of Government contracts. Because of Congressional intent to allow all responsible sources to compete, competitive procurement is the

Contract Type	Urgency of Need	Best Dollar Value	Quality	Detailed Performance Specs.	Increased Competition	Reduced Obsolescence	Reduced Admin Burden	Regulatory
Sealed Bid	+	+	+	+	+	+	+	*
Two-Step Sealed Bid	o	o	o	-	+	o	o	*
Competitive Negotiation	-	+	+	+	+	o	o	*
MYC	+	o	o	+	o	-	-	**
Options	+	+	+	+	o	-	-	
Sole Source Negotiation	+	-	o	+	-	+	o	#

Figure 6. Contracting Method Decision Matrix

Source: Developed by researcher

preferred method of contracting. Even though competitive procurement requires a great deal of effort and results in increased PALT, the current mandate for increased competition provides the impetus for agencies to follow. Competitive procedures availablefor use in fulfilling the requirement for full and open competition are: (1) sealed bids; (2) competitive proposals; and (3) two-step sealed bidding [Ref. 3: Part 6.102].

Sole source negotiation results when circumstances dictate the use of this procedure, as described in Chapter III, and requires written approval in the form of a justification and authorization (J&A), as mentioned earlier. The (#) sign in the "regulatory" concern column indicates that sole source negotiation is an unfavorable method of procurement unless circumstances dictate its use. The seven circumstances under which sole source negotiation may be used are restrictive and have a substantial impact on the agency's flexibility in the solicitation and award of contracts. Sole source negotiation does, however, allow the agency the ability to purchase material from a single source under the appropriate circumstances.

While it would appear that multi-year contracting (MYC) offers a number of advantages including lower costs, enhanced standardization, reduced administrative burden, continuity of production, and a more stable contractor work force, experience at ASO has shown that MYC is not a feasible alternative because the cost savings advertised in the MYC method don't materialize. They have found that in the few instances where MYC contracts

were awarded (primarily spare parts for ground support equipment (GSE)), the price for the first year's procurement was substantially less than for follow-on multi-year contracts. This is because contractors' investment in special tooling and equipment are written off during the first year which results in higher contract prices in follow-on years because contractors can't take advantage of the equipment depreciation which means higher contract prices to the Government. The double asterisk (**) in the "regulatory" concern column for MYC contracting denotes that this is not a preferred contracting method since, as stated in FAR Part 17.102-1, specific statutory authority is needed for an agency to make financial commitments for amounts greater than those appropriated annually by Congress.

Options also offer a very feasible alternative because they allow the agency increased flexibility in the exercise of contracts. ASO uses options extensively in the procurement of spare parts; the option clauses used consist of the purchase of up to 100 percent of the initial buy quantity, and remains in effect for 120 days. The price ceiling specified in the option clauses used by ASO stipulates that the option price is not to exceed the unit price of the parts procured under the base contract.

To summarize, for spare parts procurement at ASO the FFP arrangement offers the best alternative for contract type due to the nature of the material as well as placement of complete cost responsibility on the contractor while allocating risk equitably between the parties. The FPI arrangement is also favored because

it provides a positive, calculable profit incentive for the contractor to control costs. The IDC contract is also favored because of inventory control and financial considerations. Finally, the BOA arrangement is considered feasible because it enables ASO to obtain needed material quickly and prevent stock-outs while allowing for competition. Because of statutory requirements, sealed bidding, two-step sealed bidding, and competitive negotiation are the most appropriate contracting methods for use by ASO while sole source negotiation, when appropriate, can also be used for the acquisition of spare parts. Options can also be used to increase the flexibility of the agency's alternatives.

E. SUMMARY

This chapter presented a review of the various contract types and contracting methods in order to asses whether ASO is harnessing the full potential available through these techniques. The researcher determined that, due in part to statutory constraints, the sealed-bidding, two-step sealed bidding, competitive negotiation, options, and sole source negotiation are all viable contracting methods. The researcher also determined that the FFP, FPI, IDC, and BOA arrangements offer the most feasible alternative contracting methods.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. PREFACE

The researcher attempted to answer the following primary research question: Are there contracting techniques that can be employed to reduce PALT for spare parts procurement, and if so, what are they?

Analysis of the research data suggests that while factors external and internal to ASO's procurement process contribute to increased PALT, there are procurement methods that ASO can use to enhance the process and reduce PALT. The research accomplished in this study identified several factors that have contributed to increased PALT for spare parts procurement at ASO. These factors are presented in the conclusions cited in this chapter. The recommendation portion will address the identified shortfalls; this will be followed by a discussion of the research questions and suggestions for further research.

B. CONCLUSIONS

1. Conclusion 1

Recent legislation, specifically CICA and the initiatives to reduce the number of UPOs, has had an effect on the spare parts procurement process which has resulted in increased PALT at ASO.

As stated in Chapter III, Section D, CICA's mandate for increased competition among available sources for the award of

Government contracts has, by design, created impediments to the spare parts contracting process by requiring the appointment of a competition advocate to ensure that full and open competition is maintained and that the exemptions are not abused. The CA portion of the process has resulted in an average PALT increase of six months due to complexities in some procurements as well as difficulties in qualifying second sources. Despite efforts to solicit an increased number of vendors to compete for award of contracts, many prospective vendors are more reluctant than in the past to become directly involved with the Government bureaucracy and prefer instead to deal with prime vendors. This further complicates matters and often leads to increased PALT because of the sole source J&A requirement. The preparation and processing of J&As for non-competitive procurements can increase PALT by as much as 180 days, depending on the dollar value and level of authorization required for individual procurements.

The stipulation for increased synopsis time in the CBD prior to and after the release of the solicitation adds a minimum of 52 days to PALT. In addition, the requirement for contractors to provide certified cost and pricing data for procurements with a reduced threshold of $100,000 has added to PALT because contractors are more careful than ever before in ensuring they submit accurate and completely auditable cost/pricing data. This requirement in turn has created a backlog in the field pricing support effort; field pricing reports from DCAA and DCAS organizations can be delayed by as much as six months, and the

degree of thoroughness and accuracy with which pricing audits are performed has declined.

Since as much as 80% of ASO's contract awards have historically been through the use of BOAs, many of them unpriced to take advantage of the benefits of quick response to emergent fleet requirements, the requirement to reduce the number of UPOs has resulted in requirement dates being missed because procurement analysts have to spend more time prospectively pricing orders under BOAs. The increased number of CBD synopses for BOAs has created additional workload and backlogs in the administrative section of the PG Branch, which contributes to increased PALT.

As discussed in Chapter IV, mean BOA order total PALT has increased by 31.04 days from the pre-CICA period. Mean PALT has shown erratic behavior since the beginning of the Navy's initiatives to reduce the number of UPOs in November 1985, but has increased by 21.69 days over the pre-CICA period. PG PALT for BOAs has shown the same general trend. Mean total and PG PALT have increased significantly since November 1986 and is likely to continue its upward trend until the procurement workforce is better able to deal with the UPO initiatives and a new way of doing business.

Contracts PALT has increased steadily since October 1984. Mean total PALT has increased by 84.37 days since that time while mean PG PALT has only increased by 42.63 days. While CICA initiatives have affected the entire procurement process, it is

clear that mean total PALT has almost doubled over mean PG PALT due to the establishment of the Competition Advocate Directorate and the more stringent J&A requirements and reduced certified cost/pricing data thresholds discussed above.

2. Conclusion 2

An analysis of the various contract types and contracting methods available to procurement personnel indicates that ASO is using appropriate techniques for spare parts procurement although there may be feasible alternatives that are being overlooked.

The principal contracting methods/techniques used by ASO are competitive procurement, sole source negotiation, and priced and unpriced orders under BOAs. ASO uses FFP contracts exclusively. The researcher is lead to believe after careful analysis of the various contract types and methods that ASO is not taking full advantage of increased flexibility available through the use of FPI-type contracts. While the FPI contract is appropriate, the researcher believes that the impact on PALT for the acquisition of spare parts through its use may be negligible and perhaps negative due to the additional administrative requirements imposed on the agency.

The researcher also believes that the IDC contracting method can be employed to reduce PALT because the nature of spare parts requirements permits the agency to take advantage of the benefits offered by this method. For example, the major advantage of the DQC method is that it affords the agency the ability to procure definite quantities of supplies when they are

known in advance and have been procured through the competitive process. The nature of spare parts procurement is such that the agency has historical records of past procurements at its disposal and is normally able to project the quantity of supplies required with reasonable accuracy. On the other hand, requirements contracts offer the same advantage when the exact quantity of supplies in not known because of unstable or abnormal conditions affecting requirements.

Similarly, the IQC method offers the advantage of procuring indefinite quantities of supplies over a fixed period by placing orders with the contractor for at least a stated minimum quantity and up to a stated maximum quantity.

3. Conclusion 3

The researcher believes that ASO has taken positive measures to deal with the complexities of the process mandated by CICA and UPO initiatives.

Two recent initiatives undertaken at ASO, the reorganization of the PG Branch and the installation of the WIP procurement request tracking system, have had a positive impact on the process. The reorganization of the PG Branch, designed to reduce the ratio of buyers to supervisors and therefore increase buyer efficiency; and the alignment of the buying sections by weapon system and thus enhance the working relationship between the IMs and their respective weapon system buyers, has resulted in a more efficient use of human resources within the PG Branch.

The WIP procurement request tracking system has enabled procurement managers to track individual PRs within the PG Branch. The WIP also provides management tools in the form of reports that allow managers the ability to monitor contract close-out efforts and other internal activities from start to finish. While the WIP has improved management's ability to monitor progress within PG (and the entire procurement process, when WIP is fully implemented), is a management information (MIS) and therefore has limited application as a productivity enhancement tool that is required to allow procurement analysts to more effectively manage their day-to-day activities.

C. RECOMMENDATIONS

While it is evident that the initiatives mandated by CICA and Section 908 of the FY87 DOD Authorization Act have contributed to increased PALT, it is incumbent on agencies to become more innovative in their approach to the procurement process. Today's acquisition environment, over-regulated as it may be, is the result of Congressional intervention aimed at improving the process. Despite the good intentions of Congress, there is a general feeling among procurement managers that our acquisition process is overly micro-managed and overregulated to such a high degree that they have a difficult time keeping up with the constantly changing regulations.

It therefore becomes necessary for agencies to look for ways to improve and streamline the process in-house to counter the effects

of this legislation. Accordingly, the following recommendations are presented by the researcher as possible methods of addressing PALT while maintaining the spirit and intent of full and open competition and reducing the number of unpriced orders mandated by Congress.

1. Recommendation 1

Streamline the acquisition process and take advantage of the benefits of concurrency by releasing the CBD synopsis before the F01 buy package is forwarded to the PG Branch. It is evident from the research that valuable time can be saved by releasing the synopsis sooner. As described in Chapter II, the F01 package enters the PG loop after review by the IM/ES team, the CA Branch, and the Small Business Representative; the buy is assigned to a procurement analyst who prepares a checksheet indicating the type of procurement desired as well as other desired contract clauses. The package is then forwarded to the PSP Branch where the synopsis is prepared and other administrative functions take place.

Valuable time can be saved if the Equipment Specialist(ES) is allowed to notify the buyer of the nature of the procurement so that the buyer could make a decision on the appropriate method of procurement. The ES could then notify PSP of the results and request that the procurement be synopsized at that point. By the time the F01 finds its way to the buyer, the synopsis period will have neared completion and the procurement could then proceed without having to wait an additional 22 days (15 days for the

presolicitation plus 7 days "dead time" to ensure the synopsis is published).

Another activity that can be streamlined is the ordering of drawings, described in Chapter II. Rather than waiting for the F01 package to be reviewed by the procurement analyst and then having PSP order the drawings specified by the ES on the DD-1149, time can be saved by having the IM/ES team notify PSP by telephone of the number of drawings sets required for the procurement. Since it can take NATSF up to 30 days to provide the needed drawings, a portion of this time can be saved by requesting drawings ahead of current schedule.

2. Recommendation 2

To minimize the *potential* for duplication of administrative effort for the procurement of similar requirements within the option period, procurement personnel must ensure that options, when available, are exercised to the fullest extent vice initiating new procurement actions for the same items.

3. Recommendation 3

Implement a decision support system (DSS) to allow for increased buyer efficiency. As discussed in Conclusion 3 above, the WIP procurement request tracking system is a MIS designed to enable management to more closely monitor the procurement process. The WIP does not include the capability of allowing procurement analysts to manage their day-to-day activities such as "ticklers" for expediting and follow-up on procurements.

What is needed to increase the effectiveness of procurement analysts is a DSS to facilitate the day-to-day management of the procurement process. Features of the DSS might include document control capabilities and provisions for buyer support services, automated document preparation, information storage and retrieval, automated interface capabilities and a wider range of current and accurate management information not available on the WIP system. The potential benefits of a DSS are increased buyer efficiency and a reduction of the administrative effort (and therefore PALT) to generate a procurement.

4. Recommendation 4

Implement the use of IDC contract types when appropriate.

As discussed in Conclusion 2, IDC contracts can be made available for use when making repetitive procurements.

5. Recommendation 5

The researcher believes that ASO should seek regulatory relief or redress for the 10 percent limitation on the use of UPOs. This might be accomplished through a reallocation of the percentage goals within the Navy as a whole. For example, ASO's percentage of UPOs might be increased to 50 percent while other agencies' decreased to an appropriate level so that the Navy as a whole remains within the specified 10 percent goal.

While the current initiatives to reduce the number of UPOs have had an adverse effect on PALT at ASO, as discussed in

Chapters III and IV of this thesis, it is felt that the judicious use of UPOs has far-reaching implications toward the attainment of readiness, competition, and inventory goals. The researcher concurs with the conclusion reached by the author of a recent study of unpriced contractual actions under BOAs at ASO. The author of the study concluded that, while the use of UPOs has enabled procurement managers to meet aggressive competition goals as well as meeting obligation rates and maintaining required inventory levels, "...the ability to choose the level of UPO activity should be left to the acquisition manager as long as the definitization requirements are met" [Ref 17: p. 41-43].

D. RESEARCH QUESTIONS

1. Primary Research Question

Are there contracting techniques that can be employed to reduce PALT for spare parts procurement and if so, what are they?

The research leads the author to conclude that changes to the contracting techniques currently employed at ASO are not required. Instead, it is believed that a spirited application of the techniques now in place can be made to reduce PALT.

Increased management awareness and attention to the benefits of streamlining the procurement process through concurrency in the CBD synopsis and the ordering of technical drawings, discussed in Conclusion 1 and Recommendation 1 above, can have an effect on ASO' ability to minimize PALT.

Additionally, increased automation of the procurement function through the installation of a decision support system, discussed in Recommendation 3 above, has implications for improved buyer efficiency and management information not available in the system now in place.

2. Subsidiary Question 1

What are the essential components of PALT?

As discussed in Chapters I and II, PALT consists of those actions which take place from the time when the requirements document is generated to the date when the contract is signed. At ASO, PALT starts accumulating at the point when the SDR response is certified by the RRB and the response is manually input into the mainframe to produce an F01 procurement package; PALT stops at the completion of the ADMIN phase when funds are obligated.

3. Subsidiary Question 2

How have recent DOD initiatives to reduce spare parts prices and increase competition affected PALT?

It is clearly evident from the research that CICA and Section 908 of the FY87 DOD Authorization Act have contributed to increased PALT at ASO. Chapters III and IV discussed the effects of these initiatives on PALT.

4. Subsidiary Question 3

Do recent DOD initiatives relative to spare parts procurement adequately address PALT?

It appears from the research findings that CICA and Section 908 of the FY87 DOD Authorization Act place an overriding emphasis on reducing costs, improving competition, and strengthening the accountability of the procurement workforce engaged in the procurement process. CICA's mandate for full and open competition in the award of Government contracts and the DOD Authorization Act's mandate for reducing the level of UPOs clearly ignores any effects on the administrative processing of procurement requests by Government agencies. Chapters III and IV of this thesis discuss the effects of these legislative acts on the procurement process and PALT at ASO.

5. Subsidiary Question 4

What are the principal contracting techniques currently used for spare parts procurement?

As discussed in Chapter V of this thesis, ASO uses the FFP type of contract. The contracting methods used for the procurement of spare parts are competitive negotiation, sole source negotiation, sealed bids and priced and unpriced orders under BOAs.

6. Subsidiary Question 5

What contracting methods/types/vehicles can be effectively used to reduce PALT without sacrificing the benefits of reduced spare parts prices and increased competition?

The answer to this question was addressed in Chapter V and the previous section of this chapter. While a quantitative analysis of the potential savings in PALT from the implementation

of the recommendations enumerated above was beyond the scope of this thesis, the researcher believes that even if only small savings can be realized through the implementation of the recommendations, there is potential for decreasing PALT by as much as 47 days or more. This is based on a subjective determination of 22 days saved through the earlier synopsis of the intent to procure and an average saving of 25 days in the ordering of technical drawings from NATSF as discussed in Recommendation 1. Additional savings might be realized through the installation of a DSS, seeking redress on the UPO limitation, and using IDCs; the specific time savings cannot be estimated since the research to determine the degree of savings was beyond the scope of this thesis.

E. RECOMMENDATIONS FOR FURTHER RESEARCH

Research conducted for this study has revealed the following areas for further study. Since the research was limited in scope and methodology, these areas have potentially significant implications for continued improvements to the procurement process:

1. Research the differences in PALT for newly competitive items, previously competitive items, and sole source items to determine the specific effects of CICA and UPO initiatives.

2. Study the procurement process at ASO to determine the potential savings in PALT from the implementation of the initiatives recommended by the author of this thesis.

3. Study the feasibility of developing a "prototype" organization within ASO consisting of Item Managers, Equipment Specialists, and Procurement Analysts working together in one area on a specific weapon system to determine if PALT savings could accrue.

4. Research procurement leadtime of items awarded through unpriced BOA orders and priced contracts to analyze and compare PALT, production leadtime, procurement leadtime, contract delivery date and actual delivery date.

5. Research the specific responsibilities of Item Managers and Procurement Analysts with respect to ALT, PLT, and PCLT file data to determine what improvements can be made to ensure that those people involved in the process are responsive to factors such as RDD and other inventory management elements.

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PERSONAL COMMUNICATIONS

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