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DEFENSE SYSTEMS MANAGEMENT COLLEGE



PROGRAM MANAGEMENT COURSE INDIVIDUAL STUDY PROGRAM

MAJOR SYSTEM ACQUISITION:
IS A SEPARATE SPARES CONTRACT BETTER?

STUDY PROJECT REPORT
PMC 77-1

Louis Keith Dumas
GS-13 DAFC

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MAJOR SYSTEM ACQUISITION:
IS A SEPARATE SPARES CONTRACT BETTER?

Individual Study Program
Study Project Report
Prepared as a Formal Report

Defense Systems Management College
Program Management Course
Class 77-1

by

Louis Keith Dumas
GS-13 DAFC

May 1977

Study Project Advisor
Dr. Joseph L. Hood

This study project report represents the views, conclusions and recommendations of the author and does not necessarily reflect the official opinion of the Defense Systems Management College or the Department of Defense

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

STUDY TITLE: MAJOR SYSTEM ACQUISITION: IS A SEPARATE SPARES CONTRACT BETTER?

STUDY PROJECT GOALS:

To focus attention on the support investment aspect of the weapon system acquisition process and to examine current views on the use of a separate spares contract for the initial provisioning and acquisition of spare/repair parts.

STUDY REPORT ABSTRACT:

This study contrasts historical and current approaches to contracting for initial spare/repair parts in support of aircraft acquisition programs. Historically, spare/repair parts have been provisioned by use of support element contract line items contained in the system production contract. Recently, separate spares contracts have been used to acquire spare/repair parts for weapon systems such as the F-15, A-10, AWACS and the F-16.

The purpose of this study is to describe differences between end item and spares line item relationships on conventional system contracts and separate spares contracts. The study reviews problems anticipated and encountered in contract separation, and reports current comments and evaluations regarding the effectiveness of separate spares contracts in achieving desired benefits.

SUBJECT DESCRIPTORS: Initial Provisioning, Spare Parts, Contract

NAME, RANK, SERVICE

Louis K. Dumas, GS-13, DAFM

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EXECUTIVE SUMMARY

Increases in technology have resulted, inter alia, in the development of many innovations in business management approaches or strategies. This characteristic is especially true of the system acquisition management process where an integral component of every program is the extension of the level of technology. One of these management innovations is the use of a separate contract for the acquisition of initial spare/repair parts. The aegis of this innovation was contained in a 27 October 1971 memorandum from Defense Secretary Packard on the subject of logistics support that specifically mentioned a need for change in DoD provisioning practices.

Pros and cons of the separation of spares from system production contracts were presented in a joint AFLC/AFSC briefing to the Air Force Deputy Chief of Staff for Logistics (DCS, Logistics) in August of 1974. This briefing contained study group recommendations to delete provisioning from production contracts and shift total initial spares acquisition responsibility to the appropriate Air Force Logistics Command, Air Logistics Center. The separate contract approach has been applied in various forms and degrees to such programs as the F-15, F-16, A-10 and AWACS, and is included in the acquisition strategy of the Advanced Tanker/Cargo Aircraft (ATCA) and the B-1 Bomber.

Interviews conducted, as part of this study project, with those members of the acquisition management community experienced in the concept, indicate that the pros and cons identified by the 1974 study team were predicted with a great deal of accuracy. The benefits and penalties envisioned in 1974 are being experienced in 1977, and the debate regarding improvements to the acquisition process versus cost of more intensive management remain fairly well balanced. A quantitative "net effectiveness"

will not be available until such time as final cost-to-cost comparisons can be made. A consensus view is that there is a definite place in the library of acquisition strategy techniques for separate spares contracting. As is the case with any management tool, firm criteria of cost versus benefit must be satisfied prior to application, and each application must be tailored to specific program requirements.

ACKNOWLEDGMENTS

The willing cooperation and contribution of information, guidance and advice of all those listed on the interview table provided as Appendix A to this report is acknowledged and sincerely appreciated. All of the managers and functional specialists contacted as part of this study understood that they would not be directly quoted, but most would recognize their comments in the composite remarks paraphrased in the report.

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SECTION I

INTRODUCTION

Purpose of the Study Project

The F-16 Air Combat Fighter Program is the first major weapon system acquisition to use the technique of separate spares contracting from the onset of the Full Scale Development Program phase. Two previous programs, the F-15 and A-10 aircraft acquisitions, transferred spare/repair parts requirements from the weapon system contract to a separate spares contract during the production phase. Interviews with key logistics personnel currently involved in acquisition planning for the B-1 bomber, the Airborne Warning and Control System (AWACS), and the Advanced Tanker/Cargo Aircraft (ATCA) have confirmed that separate weapon system and spare/repair parts contracts are in being or will be used for these systems.

The purpose of this study project is to examine certain aspects of this recent development in spares contracting. Specifically, the major question is: "Why?" and the secondary question is: "What are the effects?"

Specific Goals of the Project

The primary goal of the project is to focus management attention on current limitations and opportunities for improvements to the acquisition process in a specific area. There is a relatively narrow corridor that exists between the area described as "system acquisition" (unit production), and the area defined as "operating and support" (O&S). System acquisition has the benefit of exceptional management visibility as a result of the design-to-unit-production-cost concept. Operation and support costs receive extensive management as a result of continuous cost data collection, reporting and review procedures. The in-between corridor may be called the

"support investment" area and includes all initial support activity such as initial training, data acquisition, initial provisioning and support equipment acquisition. Specifically, the report attempts to provide a platform for discussion relative to initial spare/repair parts contracting technique.

In the above connection, a secondary goal is the clarification of background and viewpoint on both sides of the separate spares contract issue. In order to obtain some degree of clarification, it is necessary that the reader become familiar with certain basic terms of reference regarding the subject of initial spares and spare/repair parts provisioning. In this regard, the following definitions are provided:

Expense Spare Parts: Generally, spare/repair parts that are repaired and/or condemned at user (field) level maintenance activities, and that have a unit cost of less than \$100.

Investment Spare Parts: Generally, spare/repair parts with a unit cost over \$10 that are repaired and/or condemned at depot level maintenance activities, or spare/repair parts with a unit cost over \$100 that are repaired and/or condemned at user (field) level maintenance activities. Investment Spare Parts include all Technical Order Compliance (TOC) kits.

Phased Provisioning: "The provisioning procedure utilized when procurement of any part of the initially computed provisioned quantity of a selected support item is deferred and the contractor is required to manufacture or procure the deferred quantity of the selected items in the end article production program at a point in time earlier than would have normally been required for production so as to create a production buffer stock. Such buffer stock would serve as an interim source of responsive

supply to meet support requirements for the selected item."¹⁰

Provisioning: "Initial provisioning is one of the Air Force's most important functions. Broadly defined, provisioning means laying in an adequate supply of material when and where needed, with the dollars we have available to support a weapon system...during the initial period of its operation."¹

Provisioning Documentation and Effort (PD&E): Provisioning documentation consists of data presented to the Government by the contractor for the purpose of identifying and selecting support items, e.g., (1) the Support Equipment Requirements Documentation (SERD) identifying the requirement for a new item of support equipment, (2) the Contractor Furnished Equipment (CFE) Notice identifying a new technical order requirement, or (3) Provisioning Technical Documentation (PTD) "...used for the identification, source-maintenance, recoverability coding, determination of initial requirements, cataloging and selection of items to be procured or supported through the provisioning process."¹² Provisioning effort, sometimes called Contractor Logistics Services, relates to costs allocated by the contractor to the provisioning process capability maintained in his company as a "level of effort" and utilized to prepare and present provisioning data requested by the Government. Provisioning Documentation and Effort is further classified, for the purpose of contract pricing, as being either predictable or unpredictable as follows:

A. Predictable PD&E: Predictable data and effort requirements result from the establishment of basic policy and procedure decisions that

¹⁰This notation will be used throughout the report for sources of major quotations and references, and corresponds to the numbered bibliography at the end of the report.

are documented by the maintenance concept and the provisioning requirements statement in the contract. The contractor is provided with a firm logic tree that can be used to predict the level of effort necessary to meet the Government's requirements.

B. Unpredictable PD&E: Unpredictable data and effort requirements generate from circumstances not covered by the predeterminations of the contract. The contractor recognizes an unforeseen data requirement and provides a recommendation to the Government which, if accepted, is negotiated on a case-by-case basis.

Support Investment Cost: Costs that are independent of the level of operations. These costs are related to the fact that a weapon system exists and is operated and supported.

Spares Acquisition Improvement Program (SAIP): This concept, sometimes called "Spares Acquisition Incorporated with Production," has the objective of reducing the acquisition price of spare parts and improving logistics support by (1) concurrent ordering of certain selected spare parts with the end item, (2) stabilizing on-order quantities, and (3) securing firm proposal and establishing firm or not-to-exceed prices for spare parts prior to contract authorization.

Scope of the Project

The report purpose and goals were discussed with a reasonably adequate cross section of the initial spare/repair part acquisition community. Views were obtained from government and contractor personnel experienced in programs where the separate spares contract technique was practiced. The utilization of this initial spare/repair part acquisition approach on a substantial number of major programs made it possible to focus on actual

experience in this area. To learn about the implementation of this concept, the following four questions were put to knowledgeable representatives of the provisioning, contracting, administration and financial management disciplines (see Appendix A, Interview Table):

1. What program management considerations indicated the need for a separate spares contract?
2. At what point in the acquisition process was the strategy adopted?
3. What, if any, were the effects of this strategy on other management processes?
4. What recommendations do you offer for further development of this strategy?

A detailed comparison of contract structure was accomplished using three USAF contracts. USAF Contract F33657-74-C-0005-P00011, 31 August 1974, to McDonnell Douglass Corporation for 82 F-4E aircraft and spare/repair parts is an example of the "classic" weapon system contract approach. USAF Contracts F33657-75-C0310, 13 January 1975, to General Dynamics Corporation, Fort Worth Division, for 301 F-16 aircraft (USAF portion), and F33657-76-C-0191, 9 July 1976, to GD/FW for F-16 provisioning documentation data, initial spare/repair parts, spares under the spares acquisition improvement program (SAIP), administrative support for phased provisioning, and logistic support are examples of the separate contract approach.

In addition, specific documentation and written report contributions were solicited and received from the Air Force Plant Representative Office (AFPRO), McDonnell Aircraft Company, St. Louis; the Inventory Management Division, Provisioning Branch, Ogden Air Logistic Center; the USAF Systems Command, Aeronautical Systems Division, F-16 System Program Office,

Procurement Directorate, Wright-Patterson AFB, Ohio; the Resident Integrated Logistics Support Activity (RILSA), General Dynamics, Fort Worth, and the Procurement Directorate, Ogden Air Logistics Center.

Limitations of the Report

The full accounting of indirect costs is not accomplished until the books are closed. In the case of government financial management, cost monitoring methods will usually not provide actual indirect cost data until approximately three years after the costs are incurred. Initial provisioning cost data finalized to the degree that inferences can be made for the purpose of cost estimating and cost comparison will not be available until the program is complete and all remaining funds have been returned to the appropriation level. It is for this reason that the report is not quantitative in nature. The degree of cost effectiveness improvements achieved by this new contracting technique will not be demonstrable until the books are closed.

Additionally, the writer is a Department of the Air Force employee, as are all personnel interviewed as part of the study. The experience base, cited examples and contracting situations are all articulated from the point of view of people involved in USAF acquisition programs.

SECTION II
CONTRAST AND BACKGROUND

The Wright Flyer vs. the F-16 Air Combat Fighter

On February 10, 1908, Captain Charles S. Wallace of the U.S. Army Signal Corps entered into a contract with Wilbur and Orville Wright, trading as the Wright Brothers of 1127 West Third Street, Dayton, Ohio, for the manufacture and delivery of "one (1) heavier-than-air flying machine, in accordance with Signal Corps Specification No. 486, dated December 23, 1907, ...at a total cost of twenty-five thousand (25,000) dollars...delivery shall be made on or before August 26, 1908."¹⁶ The contract general requirement, paragraph 8, specified that "The starting device must be simple and transportable," and dispensed with any further treatment of logistics support. There was no requirement for spare/repair parts. Possessing little background and no actual experience in flying machine support elements, the requirement for spare/repair parts was omitted.

In sharp contrast, a recent planning and budgetary computation performed to develop the USAF FY 78 budget submission to the Office of the Secretary of Defense included an estimate of \$331.545 million for initial spare/repair parts to support the Air Force's F-16 Air Combat Fighter acquisition.¹¹ This amount is budgeted to provide initial spares for a procurement planning total of 1,388 aircraft delivered during the FY 80 through FY 87 time period, and is sufficient to procure over thirteen million Wright Flyers in 1908 dollars. There are other spares costs associated with the F-16 ACF, e.g., replenishment spares bought during the above delivery period that are controlled by a separate budget process. If additional emphasis is needed, the B-1 bomber budget, as of March 1977, projects a requirement for

over one billion dollars for initial spares/repair parts to be bought in FY 77 through FY 83.

Complexity and the Trend Toward Specialization

In the seventy years between the Wright Flyer and the F-16 ACF, there has been a great increase in the number of flying machines and an even greater increase in the level of complexity of these machines. A few short steps into the chronologically arranged displays located in the United States Air Force Museum at Wright-Patterson Air Force Base will convince even the most casual observer that it was not very long before things got beyond the span of control that could be exercised by Orville and Wilbur. Advances in aviation technology were fostered by profit incentives in commercial aviation, and mission requirements necessitated by two world wars. Technology grew geometrically with each breakthrough resulting in additional opportunities for progress. The expansion of technology on all fronts dictated the trend toward specialization, and this trend was also felt in the management of technology. The nature of material or services being procured, e.g., research and development, systems development, manufacturing, etc. dictated the development of diversified procurement strategies and contractual instruments. The Armed Services Procurement Regulation currently identifies nineteen distinct types of contracts each possessing varying degrees of application or possibility for tailoring to meet procurement objectives.

A Spare is a Spare is a Spare?...

Nowhere is the cumulative impact of the proliferation of technology and management technique more noticeable than in the area of spare/repair parts provisioning for major weapon system support. The nuts and bolts,

chassis and tubes, bell cranks and manifolds purchased on Firm Fixed Price contracts have given way to the taper locks, integrated circuit boards and time-shared mux-bus components procured on complex contracts with multiple incentive arrangements. They are subjected to requirements computations based upon an Optimum Repair Level Analysis (ORLA) and the Modular Multi-Echelon Technique for Recoverable Item Computation (MODMETRIC). Spares are procured in several different ways for the same system. A typical, current spares acquisition program may consist of such techniques as Phased Provisioning, Spares Acquisition Incorporated with Production (SAIP), spares support under Reliability Improvement Warranty (RIW) or Logistic Support Cost Guarantee. In fact, the percentage of contracting effort devoted to spare/repair parts, provisioning effort and documentation and related contract clauses on a major system contract has grown to the point that the most recent innovation in systems contracting is the use of separate contracts for the end item and the spares.

The relationship between the end item and its spare/repair parts and the traditionally strong emphasis on requirements for adequate configuration management, maintainability and reliability have concerned some managers as to the appropriateness and effectiveness of separate spares contracts. It is this aspect of system acquisition, the use of a separate spares contract, that this paper will review. To avoid the comment that this study invents a paper tiger and then destroys it, it should be noted that top-level financial managers in the Government who can dismiss a million dollar variance as "rounding error" recognize the support investment budgets of major weapon systems as "truly significant sums." Additionally, under the full funding concept of weapon system acquisition, a dollar wasted on an inappropriate support investment management system is a dollar no longer

available to buy hardware.

SECTION III
WEAPONS SYSTEM CONTRACT
AND SEPARATE SPARES CONTRACT COMPARISON

The Contract Type and Purpose

Those interviewed with a right to hold an opinion in this area, i.e., those possessing a background in procurement or contract writing, were of a mind that the specific type of contract was secondary to the importance of insuring that both the weapon system production contract and the separate spares contract are the same type. It is beyond the scope of this report to deal definitively with types of contracts. It is sufficient to note that the two general families of contracts are (1) cost type and (2) fixed price type. Generally, cost type contracts are appropriate for the early phases of a program where there is a relatively high technical and cost risk. As the production phase approaches, sufficient definition of risk and uncertainty is available to warrant the use of a fixed price contract. For these reasons, it may be expected that both weapon system production contracts and separate spares contracts are of the fixed price type.

One person interviewed was far more concerned with what the contract is not than what it is. There is a universal trait among those dependent upon a contract to "just let it happen" rather than become involved in the process, and then to assume that contracting will replace some part of their planning. In this regard, a recent Defense Management Journal stated that:

The contract instrument can be the weakest link in the management of system acquisition. While contracts are indispensable records of bilateral agreements, they cannot compensate for a lack of intelligent planning...¹⁵

The purpose of the contract must, therefore, be recognized for what it is, i.e., to provide an indispensable record of agreement. The contract is not the spares acquisition plan.

Overview of a Typical Contract

The reader has probably heard the statement, "What does the contract say?" enough times to have deduced by now that very few people actually read contracts. If they did, they would not have to ask the question. The mere fact that separate contracting may increase the reading matter should not create as many adversaries as are vocalizing opposition. It is just as easy to not read two contracts as it is to not read one contract. From a user point of view, it is not that difficult to locate the subject desired in a contract and obtain the specifics required--once the general arrangement of contracts is understood.

Initially, turn the contract cover sheet and review the table of contents. You will usually find a table converting contract contents to a specific section and page number that will get you in the ballpark. Also, a schedule of provisions is provided to identify the specific page number for such provisions as "Order of Precedence" which explains the order of precedence to use if an inconsistency is encountered between different sections of the contract. "Life Cycle Support Agreements" or "Deferred Ordering of Technical Data" are other examples of headings in the schedule of provisions.

The section of initial interest is typically Section E, "Supplies, Services and Prices." To provide background and clarification for one of the issues addressed by this report, Figure III-1 provides a comparison of the structuring of contract line items on a weapon system contract including spares lines with those on a separate spares contract.

FIGURE III-1

CONTRACT LINE ITEM STRUCTURE

<u>WEAPON SYSTEM CONTRACT/F-4</u> <u>(F33657-74-C-0005-P00011 USAF)</u>		<u>SEPARATE SPARES CONTRACT/F-16</u> <u>(F33657-76-C-0191 USAF)</u>	
<u>ITEM NO.</u>	<u>SUPPLIES/SERVICES</u>	<u>ITEM NO.</u>	<u>SUPPLIES/SERVICES</u>
0001AA	Aircraft, Model F-4E(USAF)	0001	Initial Expense Items, ...
0003	Spare Parts...Item 0001AA		F-16 Aircraft, Training
0003AA	Expense Spare Parts FY__		Equip and Support Equip
0003AE	Investment Spare Parts FY__	0002	Initial Investment Items for:
0004	Aerospace Ground Equip. (AGE)	0002AA	F-16 Aircraft
0005	Spare Parts for AGE... Item 4	0002AB	Training Equip.
0005AA	Expense Spare Parts FY__	0002AC	Support Equipment
0005AE	Investment Spare Parts FY__	0003	Spare/Repair Parts IAW SAIP:
0006	Data...(DD1423) Exhibit A	0003AA	SAIP Items, Initial and replen.,
0007	Data...(DD1423) Atch 1	thru AH	Investment and expense for Aircraft, Tng. Equip. and Support Equip.
		0004	Phased Provisioning Effort
		00013	Data (DD1423) Atch. 2
		00013AA	Predictable Data
		00013AB	Unpredictable Data
		00014	Logistics Support Services
		00014AA	Contractor's Predictable Logistics Support Services
		00014AB	Contractor's Unpredictable Logistics Support Services
		00015	Special Test Equip... required in support of the delivery of initial spare/ repair parts
		00016	Data (DD1423) Atch. 3

DATA NOTE: Two data CLINS are contained in each contract. The lines in contract 0005 separate data into categories of Technical Orders and Provisioning Technical Documentation. The lines in contract 0191 distinguish between Provisioning Technical Documentation delivered to the Air Force via the Integrated Logistics Data File (ILDF), a mechanized, data element, multi-purpose data system (00013) and PTD delivered via conventional format (00016). Technical Orders for the F-16 are included in the weapon system production contract 0310.

Contract Line Item Structure Comparison

One glance at Figure III-1 is sufficient to note the additional depth of provisioning effort identified by the separate spares contract. Further inspection will establish that this same degree of breakout is possible, if desired, on the weapon system contract. The separate spares contract cannot be advocated on the basis of paper reduction as the number of pages is a function of the amount of data to be presented and nothing is gained if one paper stack grows taller as another grows shorter.

The line item breakout of provisioning technical documentation (CLIN 13, Figure III-1) on the F-16 spares contract is advocated as a method to reduce overall contract cost as a result of better visibility. This action is being debated in user implementation planning and budgeting meetings. The concept of cost control as a function of visibility will be addressed in Section IV of this report, but it must be noted at this point that a text on Government Contract Law states that:

In many instances contractors have refused to price data separately; hence, procuring contracting officers have had varying degrees of success in obtaining compliance.

With due regard then for the question as to whether or not a contractor will price data separately, it is noted that the intent of line item separation on the F-16 spares contract is to price provisioning technical documentation separate from the hardware prices.

Relationship of Contract Line Items

The relationship of spares contract line item to the end item supported can be viewed directly on the combined production and spares contract (Figure III-1). For example, item 0003 "spare parts" relates directly to item 0001 AA "Aircraft, Model F-4E (USAF)." When the contracts are separated,

as in the case of the F-16 aircraft and spares, the line item relationship cannot be viewed directly in the schedule of supplies and services. Some type of matrix is required to formally document the boundaries and interfaces of the line items on the separate contracts with line items on the system contract. In the F-16 ACF program, this interface is accomplished by the use of the line item matrix shown as Figure III-2 of this report. The interrelationship of contract line items on the -0191 (spares) and the -0310 (weapon system) contracts is indicated for each option of the system contract.

The fundamental contract line item relationship established by the matrix is further clarified by special provisions of the spares contract in areas such as "configuration management" and "ordering." For example, in the area of configuration management, the spares contract states that "the spare/repair parts furnished under this contract shall be the identical configuration, or the latest approved interchangeable configuration, as the corresponding parts utilized in the F-16 Weapon System as established by the Physical Configuration Audits conducted and approved under Contract F33657-75-C0310" (Weapon System). Since the Weapon System Contract - 0310 imposes a configuration management system on the contractor in accordance with MIL-STD-480, each formal ECP for a Class 1 change must identify the impact on spare/repair parts. It is, therefore, reasonable to assume that configuration compatibility between the two contracts, as established by the line item interrelationships, will be as tightly controlled as it would be if the line items were on the same contract.

With regard to ordering, the spares contract provision J2(b) states:

Orders for spare/repair parts in support of each numbered line item under Contract F33657-75-C-0310, as identified under the matrix Attachment "5," may be issued beginning with the effec-

tive date of this contract and ending not later than 180 days prior to the scheduled acceptance of the last aircraft to be delivered under the line item being supported.

The use of the matrix, therefore, insures the relationship of spares contract line items to the production contract line item supported as effectively as would be possible if the line items were on the same contract.

Compatibility of Production Contract and Spares Contract

The concept of separate weapon system and spare/repair parts contracts is recognized by a number of key policy and procedure references. In describing follow-on provisioning, an Air Force Systems Command Pamphlet (800-3) stated that follow-on provisioning

...is provided for in the production contract or a separate spares contract to enable the Program Office or the AFLC Air Logistics Center (ALC) to acquire new items introduced after initial provisioning is completed.

This concept has been applied to both initial and follow-on provisioning for the F-16 ACF, and the basic relationship between the two contracts is described by Provision J44 of the weapon system (-0310) contract as follows:

F33657-75-C-0310	13 Jun 76	Section J44
Spares....	(SAIP)	

A separate contract will be awarded as a means of procuring initial and/or replenishment spare/repair parts, phased provisioning documentation and logistics data for the Air Combat Fighter production option. The resultant contract will provide for concurrent release of the end article for production and will specify firm prices for identifiable LRUs and SRUs. The SAIP contract will be issued by the Air Combat Fighter System Program Office and the applicable procuring activity will be the Ogden Air Logistics Center, Hill Air Force Base for procurement of the above items.

Special provisions, such as the above, used to relate the system and spares contracts are essential whenever separate contracting is utilized.

Provisions of this type are referred to as the "marriage clause" of the contract. Another example of a "marriage clause" is provided by Appendix B to this report. This appendix is an extract from the F-15 Spares Contract (F33657-70-C-0300).

In summary, this section has attempted to demonstrate that, from a viewpoint of contract architecture, it is not possible to accomplish more in the way of documenting agreements by the use of two contracts than can be done on one contract. Consistent with this concept is recognition that nothing in the way of management control is lost as a direct result of contract separation. Yet, doubt lingers and management is concerned about some traditional problems such as duplication of effort being compounded by the use of two contracts for the same system. To clarify this concern, focus on the Provisioning Technical Documentation situation.

MIL-STD-1561 states that:

Provisioning Technical Documentation...delivered by the contractor in accordance with the requirements of this standard shall not be considered as satisfying any other contractual requirements. In the preparation of this documentation, the contractor shall, where possible, utilize data being developed for other Government requirements, reliability and maintenance analysis, etc.¹²

The concern here is most often expressed by the question, "How do we insure that the contractor is not billing us for provisioning effort on the spares contract, e.g., review of engineering drawings to identify spare/repair parts candidates, that was performed as part of the system engineering effort on the weapon system contract two years ago?" The knee jerk response to that question is usually along the lines of "Don't worry about that. That is what the Plant Reps Office (AFPRO) takes care of!" Nonetheless, the concern in areas like this remains, and cannot be dispelled by an admonition, "Not to worry."

The purpose of the preceding section has been to provide an essential overview of contract instruments to permit an informed evaluation of the comments summarized in the interview results contained in Section IV that follows.

SECTION IV
INTERVIEW RESULTS

Restatement of the Study Questions

It may be recalled that the interviews conducted as part of this study were based on the four following questions:

1. What program management considerations indicated the need for a separate spares contract?
2. At what point in the acquisition process was the strategy adopted?
3. What, if any, were the effects of this strategy on other management processes?
4. What recommendation do you offer for further development of this strategy?

The following is a synthesis of comments in each of these areas.

What Program Management Considerations
Indicated the Need for a Separate Spares Contract?

As is the case with many of the management innovations in the Department of Defense, the concept of separate spares contracting owes its existence, in some degree, to interest and direction from above. In a 27 October 1971 memorandum, Defense Secretary Packard stated that department procedures needed to be changed in the area of logistics support capability, and specifically mentioned provisioning. In response, the Air Staff initiated study toward the possibility of contracting for initial spare parts by separate contract with either the prime contractor or directly with the vendors. The results of these preliminary studies indicated that separate contracting for initial spare parts and support equipment directly with vendors should not be accomplished. This recommendation was based upon such

considerations as the potential cost of approximately one hundred and twenty separate contracts with vendors on a typical major system acquisition, and recognition of the system engineering integration effort and accomplishment required of the prime contractor.

Air Force studies conducted between April and December of 1973 on the aspect of a separate spares contract with the prime contractor documented that the provisioning process was found to be fragmented between the Program Office, the Air Logistics Center, the contractor and the contract administration office. The study recommendation was to delete spares provisioning in production (system) contracts and to shift all buying and pricing responsibilities for spares to the AFLC Air Logistics Centers. A briefing presented by AFLC/AFSC to the Air Force DCS, Logistics on 13 August 1974 documented the pros and cons of this action. A summary of these considerations is shown in Figure IV-1 of this report.

An 18 October 1974 letter from the Commander of the Aeronautical Systems Division (ASD) of AFSC to the AFSC Vice Commander documented several actions taken by ASD to improve the acquisition of spare parts and stated the ASD position on spare parts acquisition as follows:

A key factor in improving the spares acquisition process is to procure spares on a separate contract rather than as a series of line items under the systems contract. The pricing arrangements, contractual terms, conditions and clauses for spares are different in many respects from the air vehicle contract. Writing separate contracts tailored for spares will not only accommodate these differences, but will also give the AFLC System Support Manager his own contractual vehicle with which to manage his support program. For these reasons, ASD will write separate spares contracts for AFLC use in ordering initial and replenishment spare parts.

As the reader may suspect, the views of the ASD Commander were not unanimously shared in Air Force Logistics Command. The additional workload for AFLC implicit in the concept, and concerns over the relationship between

FIGURE IV-1

AFLC/AFSC APPROVED BRIEFING GIVEN TO AF/LG (LTG SNAVELY), 13 AUGUST 1974

SEPARATE AFLC INITIAL SPARES CONTRACTS

PROS

DIRECT AFLC CONTROL OF INITIAL SPARES.

PRICE VISIBILITY ON SPARES.

REDUCTION OF CERTAIN PAPERWORK.
PROVISIONING ACTIONS COULD BE
DIVORCED FROM AFSC SYSTEMS
CONTRACT(S).

COULD ALSO BE USED FOR RSP* BUYS
FROM PRIME.

IMPROVE TRACKING WITH BOTH
INITIALS AND RSPs ON ONE
CONTRACT.

EARLY CLOSE-OUT OF SYSTEM CONTRACTS.

CONS

INTRODUCES NEW CONTRACTING ACTIVITY.
ATTENDANT IMPACT ON GOVERNMENT/
CONTRACTOR RELATIONSHIP. THREE FACES
TO THE CONTRACTOR INSTEAD OF TWO.

SEPARATE CONTRACTOR ACCOUNTING FOR
SPARES REQUIRES INCREASED AUDIT
SURVEILLANCE, SEGREGATION OF COSTS, ETC.

POTENTIAL INCREASE OF OVERALL DATA COSTS.
SLIGHTLY DIFFERENT BASIC DATA REQUIREMENTS
CAUSES SOME DUPLICATION OF CONTRACTOR
EFFORT IN REPORTING.

INCREASED COMMUNICATION/COORDINATION
PROBLEMS.

INTRODUCES ELEMENT OF COMPETITION FOR
PRIME/VENDOR ASSETS. AFSC/INSTALLS VS
AFLC SPARES.

*RSP - Replenishment Spares Program

the two contracts were major obstacles to concept implementation in the view of some AFLC managers. These views were shared, in some degree, by Air Staff and a joint message from the DCS, Logistics and DCS, Requirements (AF/LG/RD 181840Z May 76) to the Vice Commanders of AFSC and AFLC stated Air Staff reservations "as to our ability to effectively and conclusively tie the two contracts together with respect to ultimate spares pricing and hardware delivered." In response to the Air Staff message, a joint AFLC/AFSC briefing was presented to the DCS, Logistics and the DCS, Requirements on 8 June 1976. This briefing, inter alia, put to rest the concerns regarding contract relationships by explaining contract details described in Section III of this report.

The consensus of personnel interviewed as part of this study report is that the Pros of the 13 August 1974 briefing (Figure IV-1) are the very same program management considerations that lead to separate spares contracting today. Major emphasis is placed upon price visibility as a means of program control. One Deputy DPML observed:

Separate spares contracting is essential to eventual achievement of DoD objectives regarding Design-to-Cost and Life Cycle Cost budgeting.

This observation is compatible with a recent Comptroller General report on the application of Design-to-Cost to weapon system acquisition that states:

The initial DoD pronouncement on design-to-cost contained in DoD Directive 5000.1 issued in July 1971, contemplated designing weapon systems to life cycle costs, but present difficulties with forecasting these costs precluded this.... DoD is now working on a system for collecting system operating and maintenance costs to help provide this (LCC) estimating capability.²

A contrasting view from one AFLC representative interviewed is that nothing significant will be achieved in the way of cost reduction by the

use of separate spares contracting or any other management innovation as long as initial spares are budgeted as a result of a cost-to-cost relationship between aircraft flyaway cost and spare/repair parts cost. An article in the January 1976 Defense Management Journal by Russell Shorey recognizes this problem and states:

A further consideration is whether the actual planning for spares and test equipment is likely to follow a *minimum cost* approach as opposed to present practices which use a percentage of initial unit acquisition cost to set the spares level.¹⁴

It appears that what is being said here is that if sixteen percent of flyaway cost is provided for initial aircraft spares, then sixteen percent will be spent even though cost reductions may be realized in the acquisition process as a result of better visibility. If this means that the ratio of support hardware to support management cost and paperwork can be increased within the existing budget parameter, it is suggested that most managers would be most happy to accept that trade off.

A major consideration expressed during the interview on this aspect of the concept was the affect that spares have on the system contract target price. Experience on previous programs (the F-111 aircraft was specified several times) demonstrated that the contract target price was significantly increased as a result of including spares lists that were targeted at substantially higher prices than were eventually established by negotiation. Further, the Program Office had little visibility, and no control, over the process. Simply speaking, removal of the spares lines from the weapon system contract removes the contribution of spares support investment costs to the Program Office potential cost growth or overrun on the system contract.

One of the most direct arguments for the separation of initial spare/repair parts acquisition from the production contract is simply to remove

a major element of potential cost growth from the Program Management Office. The value of this action cannot be disregarded in the current system acquisition environment. Today, there are six Congressional committees and two budget offices that are primarily or significantly involved in the review of acquisition program funding. The Armed Services, the Appropriations and the Budget Committees in each house of Congress, the Congressional Budget Office of the Congress, and the Office of Manpower and Budget within the Executive Branch are supported by an aggregate staff numbering in the hundreds. Additionally, interested individual members of Congress and their staffs join in the search for financial issues associated with major programs. Often, an individual with a great deal of public exposure and influence may use dollar figures obtained from sources that differ widely in their understanding of weapon system cost. The removal of a substantial amount of program funding from an area directly related to the Program Office, i.e., the production contract, can reduce potential misuse of financial data. This effect, in itself, may justify the use of separate spares contracts.

Another convincing program management consideration arguing for a separate spares contract is that separate spares contracting places the requirement for support acquisition management in the hands of the Air Force team most capable of making improvements to the process. For example, the establishment of organic depot repair capability for systems and equipment is an AFLC functional responsibility. The interface between industry repair under RIW provisions and the Air Force plan for establishing organic repair capability must be closely coordinated, and should not be fragmented between AFSC and AFLC. The shift of total spares acquisition responsibility to AFLC has already begun to improve the process.

In April of 1976, the F-16 Deputy Program Manager for Logistics (DPML) established and chartered* a study group to review specific contractor proposals regarding improvements to the spare/repair parts provisioning process, and to make recommendations for increased effectiveness in the overall spares acquisition process. The study group members constituted a representative sample of the spare acquisition community, and were experienced in "lessons learned" on previous programs such as the F-111 and F-15 aircraft acquisition.

On August 11, 1976, the Assistant DCS, Logistics, Air Force Logistics Command, signed out the F-16 Spares Study Group Final Report** containing recommendations developed during the study. The study group recommendations included near-term action required for the immediate benefit to the F-16 acquisition, and long-term recommendations for general improvements to the provisioning process. This "study group" approach to defining and tailoring provisioning processes and procedures resulted in the identification of areas where innovations in management concept could significantly improve weapon system support.

In summary, the response to this first study question appears to be a rather clear-cut recommendation to give the initial provisioning process the management attention it deserves based upon its share of the total system cost. The specific method of accomplishing the required increase in management is the use of a separate spares contract.

*ASD/YPL Message, 261805Z April 76.

**AFLC/LOL Letter, 11 August 76.

At What Point in the Acquisition Process
was the Strategy Adopted?

Without exception, the answer to this question was: "too late." In the case of the F-15, the separate spares contract was signed during the Full Scale Engineering/Development phase after high dollar spares breakout (AFR 57-6) had been accomplished on the weapon system contract. Once executed, the separate spares contract was used for all spares provisioning.

The A-10 acquisition program converted to a separate spares contract midway through the first production option.

Even though all initial spares for the F-16 ACF will be provisioned under the separate spares contract, it should be noted that the contracts were not concurrently negotiated, and the exercise of SAIP options is identified by the spares contract and executed on the system contract.

What happens when the concept of separate contracts is implemented, but the timing is out of phase? One AFLC representative commented:

When a separate spares contract is negotiated subsequent to system contract award, a sense of urgency for timely delivery of spares is lost. The contractor can afford to negotiate on his terms since he already has the end items on contract with a delivery date. If both spares and end items are negotiated on the same contract, the whole system is equally important and the contractor seems more inclined to consider spares.

In this same context, a Provisioning Specialist stated:

On a spares only contract, negotiations lead to a legal terminology battle to identify effort, services and data. The contractor can negotiate terms to his benefit with time on his side. The production contract moves along while the support date is drawing to a critical stage. The USAF finds itself in a bind rather than the contractor.

The message here is: "If you're going to do it, do it together."

In consideration of compatibility of contracting effort and timing, the alternatives (like Gaul and practically everything else) may be divided into three parts:

Alternative	<u>PCO</u>			<u>CONTRACT</u>		
	<u>AFSC</u>	<u>AFLC</u>	<u>JOINT AF</u>	<u>SYSTEM</u>	<u>SPARES</u>	<u>COMBINED</u>
I	X			X	X	
II	X			X		
		X			X	
III			X			X

It is difficult to counter the argument that the best business practice involves one Government negotiating team in the award of one, combined contract where pricing formulas for end items, spares and special provisions, e.g., SAIP and RIW can be interrelated during the competition and source selection. Any other approach will result in fragmentation of either the Government negotiating effort or the results of negotiation.

What, if Any, Were the Effects of this Strategy on Other Management Processes?

The decision to divorce spare/repair parts and logistics data from the management provisions of the production contract imposes a separate requirement for management controls on these elements of the acquisition process. In other words, now that you have it isolated and under the light, what are you going to do with it?

An example of the effects of separate spares contracting on other management processes is the application of Cost/Schedule Control Systems Criteria (C/SCSC) to the F-16 Spares Contract. Lacking the covering blanket of management control systems imposed by the production contract, a parallel set of controls must be developed. A December 1976 letter* from the Air Force Plant Representative's Office (AFPRO), at General Dynamics

*AFPRO/TMD Letter, 21 December 1976

Fort Worth Division raises some pointed questions regarding these effects. For instance, "the contractor's present accumulation system does not identify total individual parts costs. Incorporation of a total costing of individual parts would necessitate an appreciable adjustment to their accounting system. This is a significant expansion to the present validated system." Further, even assuming that a restructuring of cost accounting could be accomplished, the AFPRO questions the ability of a separate C/SCSC to provide any actual control of spare/repair part price fluctuation. This question is based upon observation that contractor proposals and the basis for spares price negotiations are both conditioned by concurrent manufacture of spares and production hardware. Although the AFPRO has not taken a firm position on the issue, it appears that investigation of these questions could render the application of C/SCSC to the separate spare contract "feasless," i.e., it is not feasible to restructure an otherwise acceptable and adequate cost accounting system; and even if it were, it would be useless.

To resolve this complex issue, a C/SCSC review team has been formed by the Air Force Systems Command Director of Cost Analysis, DCS, Comptroller to review the contractor's internal planning and control system.* This team will determine the degree of compliance with C/SCSC and provide recommendations for acceptance or rejection of the system.

It should be noted that the contractor is as reluctant to change as anyone else, especially where he is not familiar with the relationship between cost and profit and may avoid venturing into relatively unknown waters. In a report to the Congress, the Comptroller General has

*AFSC/ACC Letter, 20 December 1976

commented that:

...it must also be understood that profits are largely a function of cost and the profit motive acts as a disincentive to reducing costs substantially.²

None of the personnel interviewed had encountered a problem generated by the separation of contract coverage that would warrant discontinuing the use of the concept. Change of any kind is accompanied by side effects and new problems. To paraphrase Kahn, separate spares contracting faces the problem of all new planning "...it represents an attempt to introduce rationality into a world of interest groups, bureaucratic rigidities, informal organizations, politics, and many uncertainties." If it is made clear that the purpose is not to eliminate all of these, "...but rather to optimize the rational components in the process..." the new effort will work comfortably and usefully.⁶

What Recommendations Do You Offer
for Further Development of this Strategy?

Comments provided during the interviews on the question of continuing and refining the technique of separate spares contracting were grouped around two positions on the issue. One position holds the opinion that application of the concept to all future systems acquisitions is absolutely essential to achievement of DoD objectives in such areas as life cycle cost projection and control, and improvements required in the processes used to develop cost effective logistics support. Advocates of this position share the idea that current emphasis on the proportion of weapon system life cycle cost that is allocated to operations and support necessitates improvements in support investment cost management. One Procuring Contracting Officer insists that: "If operating and support costs are going to share the spotlight with end item acquisition costs, then the same degree of

management visibility must be applied to support item acquisition."

On the other side of this issue, a significant number of those interviewed have little confidence that the costs and effort required to gain additional management visibility will produce offsetting benefits. A financial manager interviewed advised that: "Visibility in the form of expensive applications of Cost/Schedule Control System Criteria do not guarantee that cost thresholds will not be broken. There are sufficient examples of major programs that have experienced substantial cost overruns while under extensive management control scrutiny."

It appears that the question at issue here is the net worth of activity in the margins. How much additional management cost is required to achieve a marginal reduction in the indirect cost of support investments? It is recognized that almost anything can be achieved with money. One engineering cliché is that there are no technical problems, only cost and schedule problems. The real management question is one of marginal benefits or the economics of control. Where do we want to go with separate identification and management of the support investment? Every planning action that management takes in this area will result in change to the amount of control at the operating level. That is to say that every control plan must bear the expense of detailed execution. One management text cautions that:

While planning and control are often separated conceptually for discussion purposes, it is important to recognize that they are inseparable in practice.⁷

The end result of an executed plan is, therefore, a change that can be measured to establish a net value. The net value, or difference between marginal cost and marginal benefit can then be used to recommend continuation of a practice or suggest alterations to increase net value. In the

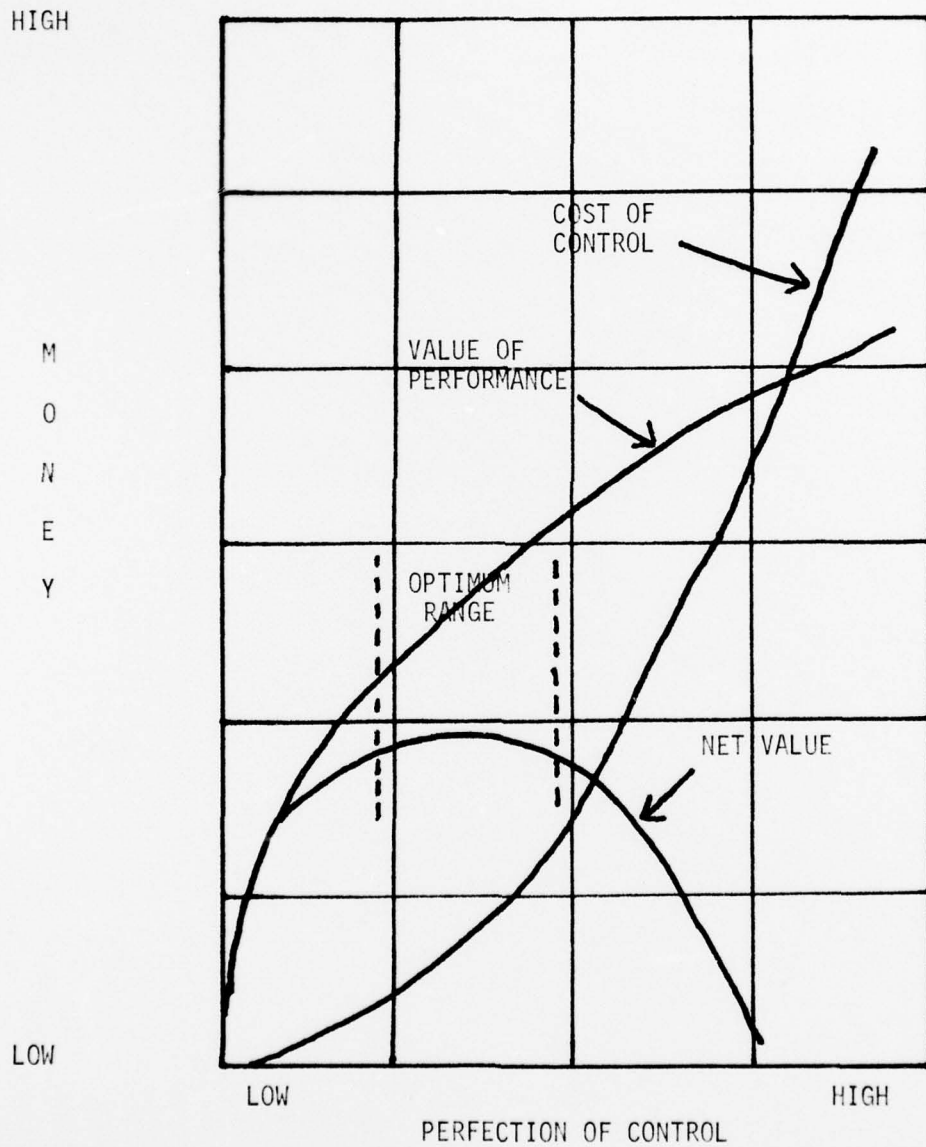
implementation of concepts such as separate spares contracting, it is often easy to overlook the possibility of negative net value. The comments "DoD wants us to change," or "better visibility provides better control and reduced cost" are typical of the narrow view that fails to recognize the potential of negative net value. The model diagrammed in Figure IV-2 demonstrates graphically the idea of diminishing returns. You can get too much of a good thing. Management planners involved in weapon system acquisition must be encouraged to take the wider view. In Litterers' book on the management of organizations, he discusses management control as follows:

Control is concerned not only with the events directly related to the accomplishment of major purposes, but also with maintaining the organization in a condition in which it can function adequately to achieve these major purposes.⁸

The important point is that you can control yourself out of business if the focus is on control at any price. In an August 1972 report titled, "The Program Manager Authority and Responsibilities (LMI Task 72-6)" the Logistics Management Institute stated that one of the disadvantages associated with a powerful program management organization is that, in some cases, they "produce severe, negative impacts upon the total functional logistics system of a Military Service." Further, "some of those negative impacts have manifested themselves in the form of ignoring established Service supply doctrine and stockage, spare parts, and standardization policies."

No one has accused an Air Force Program Management Office of producing severe, negative impacts on the total logistics system by the use of a separate spares contract, but there are those who hold that the decision and action were justified after the fact with the rationale that separation

FIGURE IV-2



SOURCE: Mundel, Marvin E. A Conceptual Framework for the Management Sciences. New York: McGraw Hill Book Co., 1967, p. 174.

provides visibility; visibility provides control, and control will ultimately reduce costs. Those holding this view are encouraging that much more be done in the way of marginal cost analysis before the concept "becomes traditional and therefore not questioned."

A summary comment to place the issue of control in better perspective is provided by Richard Bellman in his article on control theory in Scientific American magazine:

The term can be defined to include any rational approach used by men to overcome the perversities of either their natural or their technological environment. The broad objective of a control theory is to make it (the management process) more reliable, more convenient or more economical.³

SECTION V
SUMMARY AND CONCLUSIONS

The objectives of the DoD regarding design-to-cost have, for the most part, been achieved by innovations in the acquisition process. The next objective in this management area is achievement of an effective technique for Design-to-Life-Cycle-Cost, and in this area a reliable data base is not currently available. The Joint Design-to-Cost Guide used by DoD components admits that "Until the data base concerning O&S cost by program is sufficiently strengthened, monetary cost goals are not required...."⁵ The development of the separate spares contracting technique offers a significant potential for improving management visibility and control of the costly initial spares portion of the O&S investment. Although relatively little experience has been gained, and quantitative analysis is not available, the reaction and results to date have been generally favorable. What is apparently needed at this point is a clear statement of specific guidelines for the use of a separate spares contract based upon a logical method of projecting marginal net value.

To the extent that the separate spares contract brings an increased awareness of support investment cost to the acquisition community, it will exercise increased potential for the control and reduction of the support share of the weapon system life cycle cost.

INTERVIEW TABLE

The following table identifies key personnel contacted, either by telephone or in person, to obtain subjective comments and evaluation regarding the use of a separate spares contract to provision initial spare/repair parts vs. the use of spares contract line items on the weapon system contract. The interview was conducted on a "non-attribution" basis, and in each case permission was obtained to reference the interviewee as an information source for this study.

<u>NAME</u>	<u>ORGANIZATION</u>	<u>GENERAL RESPONSIBILITY</u>
Bahan, T.	AFALD (ATCA Office)	Deputy to DPML
Burchett, J.	ASD/YPL (F-16 SPO)	Deputy to DPML
Combs, C.	AFALD/SDI (F-16)	FMS Project Manager
Daniel, R.	ASD/YHL (B-1)	Dep Dir ILS
Ernst, W.	OO-ALC/PPW	Procurement
Everett, B.	OO-ALC/PPW	Procurement
Franke, D.	ASD/YPL (F-16)	ILS
Hyson, J.	ASD/SDM	Systems Management Policy
Jacobsen, W.	OO-ALC/MMA (F-16)	Financial Management
Juenger, M.	OO-ALC/MMA (F-16)	Systems Management
Laverdure, L.	ASD/YXL (A-10)	Deputy to DPML
Niemeier, W.	AFLC/PPP	Procurement Policy
Pawlow, T.	AFPRO McDonnell Acft Co	Contract Administration
Phipps, R.	OO-ALC/MMA	Data Management
Rush, R.	F-16 RILSA GD/FW	Provisioning
Schaeffer, J.	ASD/PP	Procurement Policy
Storm, B.	OO-ALC/MMI	Provisioning Policy
Townsend, J.	ASD/YPK (F-16)	Procurement

EXTRACT FROM F-15 SPARES CONTRACT

J-3. RELATIONSHIP BETWEEN THIS CONTRACT AND CONTRACT F33657-70-C-0300

a. This contract is established to procure F-15 Weapon System Spare/Repair Parts for support of Contractor's deliveries and other performance under contract F33657-70-C-0300. Accordingly, this contract will be so construed as to effect such end and no provision hereof shall change or effect any of the rights or obligations of the parties under contract F33657-70-C-0300.

b. It is recognized that Contractor's performance is dependent upon the continuance of contract F33657-70-C-0300 in accordance with the terms of such contract. Contractor shall, however, segregate all costs incurred in the performance of orders hereunder from those incurred under contract F33657-70-C-0300 and nothing hereunder shall change or effect any of the rights or obligations of the parties under the Charging and Allocation of Costs provision of contract F33657-70-C-0300.

c. Modifications made to contract F33657-70-C-0300 which affect this contract F33657-73-C-0267 shall be incorporated into a modification of this contract in a timely manner. Those modifications that are anticipated to have adverse effects should be brought to the attention of the ASD/YFK PCO prior to the execution of the modification to contract F33657-70-C-0300.

d. Update and Modification Change Kits required in support of items procured under the terms of this contract shall be procured and managed in accordance with Attachment No. 2 of contract F33657-70-C-0300. Changes associated with Update/Modification Kits will be against items 6 and/or 12 of contract F33657-70-C-0300 as applicable.

e. Configuration management of items procured under the terms of this

contract shall be accomplished under the provisions of Part XXI of Contract F33657-70-C-0300. All charges associated with the configuration change shall be properly chargeable to contract F33657-70-C-0300.

f. All CDRL items associated with the spares provisioning process shall remain on contract F33657-70-C-0300. Accordingly, this contract will be so construed as to effect such end and no provision hereof shall be interpreted to change or effect any of the rights or obligations of the parties under contract F33657-70-C-0300.

g. Nothing under this contract shall be construed as to change or effect any of the rights or obligations of the parties as they relate to the Total System Performance Responsibility provision of contract F33657-70-C-0300.

h. Added by P003.

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