SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO. AD-A084973

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Simplifying Contracts for Commercial Systems. A Case Study of DOD Acquisition of Commercial Systems and Components, Volume I, [redacted]

5. TYPE OF REPORT & PERIOD COVERED

6. PERFORMING ORG. REPORT NUMBER

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8. CONTRACT OR GRANT NUMBER(s)
F33615-78-C-5213

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Don Sowle Associates, Inc.
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Arlington, VA 22202

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
AFBRMC/RDCB
Wright-Patterson AFB, OH 45433

12. REPORT DATE
Jan 1980

13. NUMBER OF PAGES
103 - Vol I, 159 - ~~Vol II~~

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)
--

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
--

LEVEL III

16. DISTRIBUTION STATEMENT (of this Report)
This document has been approved for public release and sale; its distribution is unlimited.

DTIC ELECTE JUN 2 1980 D

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES
Analyze the process and reasons for contract provisions and regulations

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Buy Commercial
Reliance on Commercial Distribution
Reduce Unnecessary contract provisions
Simplify management information requirements

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
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80 5 29 052

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD A084973

DDC FILE COPY

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The report discusses those contract terms, conditions, and statement of work requirements imposed by the Government in the acquisition and support of commercially developed aircraft not found in commercial acquisitions. Research was based primarily on the acquisition and logistics support contracts for the KC-10 Advanced Tanker Cargo Aircraft system. This was followed by analyses of the acquisition and support contracts for the E-4 Advanced Airborne Command Post system and the support contract for the C-9 Aeromedical Evacuation Aircraft system to determine if the impact of the Government-imposed requirements substantiated the findings of the KC-10 research and if not, to identify the differences. To gain further insight into the differences in Government and commercial acquisition practices, an analysis was made of the Air Force acquisition of a major item of ground support equipment for these sytems, the Diesel Engine Driven Generator, which was commercially developed and in widespread use by commercial customers.

Higher cost is generated and program stretch-out becomes a possibility when government imposed requirements for additional documentation and reports are demanded indiscriminately. Compliance with special contract terms and conditions increases contractor overhead. Market research and analysis can develop a good business arrangement thereby developing a knowledgeable acquisition strategy for meeting government requirements.

SIMPLIFYING CONTRACTS FOR COMMERCIAL SYSTEMS

A CASE STUDY OF DOD ACQUISITION OF COMMERCIAL SYSTEMS AND COMPONENTS

CONTRACT F 33615-78-C-5213

VOLUME I

JANUARY 1980

DON SOWLE ASSOCIATES, INC.
ARLINGTON, VIRGINIA

VOLUME I

SIMPLIFYING CONTRACTS FOR COMMERCIAL SYSTEMS

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January 1980

Acknowledgment of Sponsorship

This Project Was Sponsored By
Air Force Business Research Management Center (BRMC)
United States Air Force
Wright-Patterson AFB, Ohio 45433

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SIMPLIFYING CONTRACTS FOR COMMERCIAL SYSTEMS

EXECUTIVE SUMMARY

The Office of Federal Procurement Policy issued policy in May 1976 for the acquisition and distribution of commercial products when such products will adequately serve the Government's requirements. The policy applies to all items, principal and secondary, including commercially developed systems. The Department of Defense is in the process of developing implementing regulations and procedures and revising existing policies where needed to integrate the "buy commercial" policy into the acquisition process, using commercial practices where appropriate and feasible. To support the integration of this policy into the process for acquiring commercially developed systems, research was conducted on Air Force contractual actions in acquiring derivatives of commercially developed aircraft and contract logistics support. The results of the research are contained in this report.

The findings reported herein relate to those contract terms, conditions, and statement of work requirements imposed by the Government in the acquisition and support of commercially developed aircraft not found in commercial acquisitions. Research was based primarily on the acquisition and logistics support contracts for the KC-10 Advanced Tanker Cargo Aircraft system. This was followed by analyses of the acquisition and support contracts for the E-4 Advanced Airborne Command Post system and the support contract for the C-9 Aeromedical Evacuation Aircraft system to determine if the impact of the Government-imposed requirements substantiated the findings of the KC-10 research and if not, to identify the differences. To gain further insight into the differences in Government and commercial acquisition practices, an analysis was made of the Air Force acquisition of a major item of ground support equipment for these systems, the Diesel Engine Driven Generator, which was commercially developed and in widespread use by commercial customers. The major findings of the research are summarized below:

1. Approximately 100 General Provisions were included in each of the contracts studied, most of which are meaningless when applied to the purchase of aircraft, spares, or support equipment already produced (off-the-shelf), or are impractical to enforce when applied to commercially developed items in regular production, only a portion of which is purchased by the Government.

2. In the aggregate, General Provisions, particularly those that are required to be included in subcontracts (flowdown), have a significant administrative impact on the contractor, increasing his cost to produce the system over that required to produce for commercial customers.

3. Documentation requirements were approximately one third of the documentation normally required for the new development of a military aircraft system. However, the documentation far exceeded that required in FAA and commercial practices.

4. Extensive documentation of management systems was required by the statement of work. Documentation of management systems was not required by commercial customers for the same basic aircraft.

5. Military Specifications and Standards were applied primarily to modifications to the basic aircraft resulting in two different approaches to the acquisition of a single system, i.e. using commercial standards for the acquisition of the basic airplane and military standards for the modifications.

6. Payment for logistics support based on flying hours simplified spare parts acquisition and accountability but created a problem in cost allowance for contractor capital investment in the parts stocked at operating bases. The solution (Air Force investment in initial provisioning) has the potential for downstream problems associated with property title and accountability.

7. Commercial Diesel Engine Driven Generator sets acquired after market research and comparative testing of commercially developed generators with those produced to military specifications, are superior in performance, require less maintenance, and cost less to acquire and operate than those which are part of the DOD standard family of generators.

8. The follow-on purchase of Diesel Engine Driven Generators is planned to be supported through the Government supply system although commercial distribution of replacement parts is available worldwide where parts can be made available on a quick reaction basis.

The following major recommendations are summarized based on the findings of the research:

1. Develop and obtain approval to use a special set of General Provisions for acquiring commercial systems and products, eliminating those that are not essential or have no practical effect and minimizing the flowdown impact consistent with clause objectives and sound practice.

2. Acquire modified commercial systems in the same manner as commercial systems if the system is available through regular production and the cost of the modifications does not exceed 35 percent of the price of the basic system. If the modifications exceed 35 percent they may be accomplished under a separate contractual arrangement.

3. Rely on FAA standards and established commercial practices and documentation in acquiring commercially developed and proven aircraft to the greatest practicable extent.

4. Where contract logistics support is integrated with support of commercial counterparts, devise a procedure whereby the Government does not take title to spares in view of the problems associated with accountability, traceability and the requirements of the Service Contract Act.

5. Establish requirements and guidelines for the conduct of market research and analysis in order to develop a knowledgeable acquisition strategy for meeting Government requirements (product and support).

6. Rely on commercial distribution and support systems where they are available and adequate to meet Government requirements.

ABBREVIATIONS

The following abbreviations used throughout this case study have the meaning stated:

AARB	Advanced Aerial Refueling Boom
ACSN	Advanced Change/Study Notice
AFAD	Air Force Acquisition Documents
AFB	Air Force Base
AFLC	Air Force Logistics Command
AFR	Air Force Regulation
AFSC	Air Force Systems Command
ARB	Aerial Refueling Boom
ASD	Aeronautical Systems Division (AFSC)
ATCA	Advanced Tanker/Cargo Aircraft
CBEMA	Computer and Business Equipment Manufacturers Association
CDRL	Contract Data Requirements List
CFR	Code of Federal Regulations
COMBS	Contractor Operated and Maintained Base Supply
CSEL	Consolidated Support Equipment List
CWBS	Contract Work Breakdown Structure
DAC	Douglas Aircraft Company
DARC	Defense Acquisition Regulation
DD	Defense Department
DID	Data Item Description
DOD	Department of Defense
DOL	Department of Labor

ECP	Engineering Change Proposal
EO	Executive Order
EPA	Environmental Protection Agency
FAA	Federal Aviation Agency
FLSA	Fair Labor Standards Act
FS	Federal Supply
FY	Fiscal Year
GAO	General Accounting Office
GFY	Government Fiscal Year
GSA	General Services Administration
HPA	Head of a Procuring Activity
HQ	Headquarters
JPO	Joint Program Office
MAC	Military Airlift Command
MDC	McDonnell Douglas Corporation
MIL	Military
MOB	Main Operating Base
NASA	National Aeronautics and Space Agency
ODM	Office of Defense Mobilization
OEP	Office of Emergency Planning
OFPP	Office of Federal Procurement Policy
OSHA	Occupational Safety and Health Act
OT&E	Operational Test and Evaluation
PL	Public Law
RFP	Request for Proposal
SAC	Strategic Air Command

SCA	Service Contract Act
SCN	Specification Change Notice
SERD	Support Equipment Recommendation Data
SOW	Statement of Work
STD	Standard
UPM	Unit Price Matrix
USAF	United States Air Force

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CHAPTER I - INTRODUCTION

When the Department of Defense acquires commercially available systems and commercial logistics support, the solicitation and resulting contract requirements generally impose administrative burden and other costs in excess of those that are necessary for the contractors to sell the system and logistics support to a commercial customer. Examples of these additional requirements are; documentation and reporting, obtaining prior approval of required plans, processing engineering changes and support equipment requirements, contract administration actions, and the need to analyze large numbers of general provisions to assure understanding of the conditions which must be complied with. All of these requirements can increase the contractors cost to deliver the system and provide support. Many of the requirements are also required to be imposed on subcontractors by the prime contractor. To better understand the impact of these contract requirements, a case study was made of the contractual elements used by the Air Force in the acquisition and logistics support of several systems derived from commercially developed aircraft. Those systems are the KC-10 Advanced Tanker Cargo Aircraft system, the E-4 Advanced Airborne Command Post system and the C-9 Aeromedical Evacuation Aircraft system.

To augment the case study on commercial systems, investigations were made of the practices followed by the Air Force in the acquisition of a major item of ground support equipment which had been commercially developed and is in widespread use by the

commercial airlines. The acquisition of 136 diesel engine driven generator units by the Sacramento Air Logistics Center (AFLC) was reviewed for purposes of analyzing the approach taken to determine suitability of the commercial generators to meet user needs and the impact of military contracting methods for purchasing commercial products.

Commercial Acquisition Policy

The Commission on Government Procurement recognized in its final report in 1972 the need for a shift in fundamental philosophy relative to the procurement of commercial items.[1] This shift in philosophy envisioned greater reliance on privately developed off-the-shelf products and established commercial distribution systems to support those products, when they meet the Government's needs. The impetus for this shift was the cost of developing products to meet detailed Government specifications where commercially developed products would suffice and the duplication of existing commercial distribution systems. Cost, however, was not the only consideration. Fundamental to the Nation's economic and political philosophy and basic to the relationship between Government and private industry is the commitment by the Federal Government to rely for its needs upon the private sector.[2]

The recommendation of the Commission on Government Procurement concerning commercial products was made policy by the Office of Federal Procurement Policy (OFPP). A memorandum for the Secretary

1. Report of the Commission on Government Procurement, Volume 3, December 1972
2. Office of Federal Procurement Policy Memorandum, Procurement and Supply of Commercial Products, 24 May 1976

of Defense, Administrator of Veterans Affairs and Administrator of General Services, "Procurement and Supply of Commercial Products," was issued on 24 May 1976. It stated that the procurement and supply processes of the executive branch must be thoroughly examined and appropriate revisions made with the objective of implementing the following policy:

> "The Government will purchase commercial, off-the-shelf, products when such products will adequately serve the Government's requirements, provided such products have an established commercial market acceptability. The Government will utilize commercial distribution channels in supplying commercial products to its users."

A subsequent OFPP memorandum, "Implementation of Policy on Acquisition and Distribution of Commercial Products (ADCP)" was issued on December 27, 1977. The Department of Defense followed with DOD Directive 5000.37, "Acquisition and Distribution of Commercial Products (ADCP)", issued on September 29, 1978. This directive was made applicable to all DOD components. It also stated that ADCP policies apply to all end items; weapons, equipment, components or material for which commercial products are used or can be used, including principle and secondary items. To further support this directive, OFPP issued a draft Federal Acquisition Regulation (FAR) Parts 10 and 11[3] which further defines "commercial product" as follows:

> "Commercial product" means a product (item, material, component, subsystem, system, or service) available from stock or regular production that is sold to the public at established catalog or market prices."

3. Federal Register, page 55912, Friday, September 28, 1979, Notice of Availability and Request for Comment, FAR Parts 10 and 11

The Department of Defense is developing implementing procedures and revising existing policies where needed to integrate ADCP policy into the total acquisition process. A pilot program for acquisitions of commercial products based on current DOD requirements was initiated under the Commercial Commodity Acquisition Program (CCAP).[4] CCAP preceded the DOD directive on ADCP policy to surface issues and solve problems encountered in its application. The Air Force acquisition of 136 diesel engine generators was one of the pilot cases under CCAP.

It is contemplated that the results of this study will be made available to the DOD Program Manager for Acquisition of Commercial Products to assist in the development of DOD policies and procedures in implementation of DODD 5000.37. The report is significant in this respect since it addresses contract requirements and business practices that adversely impact on implementation of ADCP policy.

Study Objectives

Research was conducted to determine which provisions and requirements imposed by the Air Force in acquisition and logistics support contracts for a typical commercial system and a major product, not imposed in a commercial sales contract, have a cost and schedule impact and, where possible, the extent of the impact. Analyses were made to ascertain the necessity for these provisions and requirements and to develop recommendations concerning their

4. Office of the Secretary of Defense Memorandum, Commercial Commodity Acquisition Program (CCAP), 14 January 1977

use in future Government contracts to buy commercially developed products. Specificially, the objectives of the study were to:

1. Examine current statutory and regulatory provisions and military requirements imposed in Government contracts for the acquisition of commercially developed products.

2. Describe and analyze the process and reasons for requests by both the Government and contractors for waivers and deviations to clauses, specifications, and requirements.

3. Compare Government and commercial management practices as related to the acquisition of commercially developed aircraft.

4. Estimate the cost, schedule, and administrative effects of Government imposed contract terms, conditions and requirements which are not imposed in commercial contracts.

5. Provide suggested revisions to Government policies and practices within existing statutes and laws in contracting for commercially developed products.

6. Identify and explain those socio-economic and environmental statutes that impact the economical purchase of commercially developed products.

Study Methodology

The approach to the study was to limit the investigation to the contract terms, conditions and requirements of the Statement of work to establish a baseline of data for impact analysis. The first step in conducting the study was the identification of data for detail analysis. After obtaining the

solicitation and acquistion documents, each page and paragraph were reviewed and analyzed to identify those requirements having potential adverse impact on cost, schedule, or administrative burden. This identification was based on the experience and judgement of the researchers. These requirements were documented as data elements and classified in accordance with the study tasks for exhaustive analysis.

Following the identification of data elements needing further investigation, the source of the requirement, i.e., specific statute, Executive Order, directive, regulation, etc., was identified to determine the intent of the source document as it relates to acquisition of commercial products. Supporting data was then gathered pertaining to the actions required and the concomitant cost in dollars, manhours, delays, etc., to comply with each requirement. Data was gathered through visits to the program offices and contractor's facilities. Final analysis of the data elements was made, and suggestions for policy changes developed.

Also, efforts were made to develop a methodology for measuring the cost of compliance with Government contractual requirements. With the identification of specific requirements which have a cost impact, attempts were made to determine the costs incurred in the compliance with each requirement. For this data, a methodology would be devised which could be used to replicate such data for other acquisitions. It was found that the cost of compliance with each requirement could not be specifically

identified because costs were not accumulated in the cost accounting systems to segregate such costs. The efforts to quantify such costs did, however, result in some insight into the specific costs but only a summary approach to a methodology evolved.

Other efforts to identify the contractor's cost of doing business with the Government were reviewed for inputs concerning the development of such a methodology. In March 1979, Arthur Andersen and Co. reported on its study of the Cost of Government Regulation for the Business Roundtable which was directed at costs incurred in complying with the regulations of six Federal agencies. The methodology derived from that study was not applicable to the costs of compliance with specific Government contractual requirements for the KC-10 and others. Another study, by the Comptroller General of the United States, attempted to identify specific costs of doing business with the Government. The GAO study, initiated in July 1975, found that it "was most difficult for any methodological approach to try to capture many so-called indirect or non-recurring costs." An Analysis of the GAO results is contained in Volume II.

Study Reports

The study was conducted in accordance with specific tasks which related to the above mentioned objectives. In the analysis of data acquired according to the tasks, it was found that there were several major areas of concern which cut across various task objectives. For that reason, the results of the study will be documented in two volumes:

Volume I - Includes introductory and background information for the study, and discussion, facts and observations, conclusions and recommendations related to the major areas of concern identified as a result of the analyses. The major areas of concern are: Mandatory General Provisions of the Contracts; Military Requirements of the Statement of Work; Corollary Findings in Government Acquisition of Commercial Systems; and Contract Logistics Support. A full discussion of the acquisition of the Diesel Engine Driven Generator is included as a separate chapter of Volume I.

Volume II - Includes the detailed data resulting from the study which support the conclusions and recommendations contained in Volume I. The detailed data are presented by the specific tasks of the study.

Acknowledgments

The study was conducted under Contract F33615-78-C-5213, effective 25 September 1978, sponsored by the Air Force Business Research Management Center, Wright-Patterson Air Force Base, Ohio. Guidance was provided by Major Lyle W. Lockwood, Deputy Director of the Air Force Business Research Management Center. Background information and support data were provided by the Air Force KC-10 Joint Program Office, the E-4 Program Office, Sacramento ALC, the Douglas Aircraft Company of the McDonnell Douglas Corporation, the Boeing Company and Hobart Brothers. The wholehearted cooperation and assistance of the following individuals are acknowledged:

KC-10 JPO - Brigadier General Kenneth W. Bell, Program Director
- Mr. T. E. Bahan, Business Manager
- Lieutenant Colonel Lee Rigby, Director of Procurement and Production
- Mr. Ronald Chalecki, Contracting Officer, KC-10 Acquisition
- Mr. Joseph Farry, Contracting Officer, KC-10 Logistics Support

E-4 PMO - Colonel Gerald Berkowitz, Deputy Program Manager
- Colonel Donald Scott, E-4 Chief Engineer
- Mr. Fred Obey, Director of Procurement
- Mr. Roger Collins, E-4 Contracting Officer

Sacramento ALC

- Mr. Ray Will, Air Force Generator Program Manager
- Mr. Donald Tadlock, Generator Contracting Officer

Douglas Aircraft Company

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- Mr. D. F. Young, Manager, Procurement Analysis
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Boeing Air raft Company

- Mr. J. A. O'Hara, Director of Contract Policy

Hobart Brothers

- Mr. Adam Callan, Vice President, Marketing

CHAPTER II - BACKGROUND

A number of derivatives of commercially developed aircraft have been acquired by the Air Force to meet military requirements. There are savings in cost and development time in acquiring commercial derivative aircraft. Also, by maintaining commonality with commercial counterparts, there are savings to be made in using existing commercial maintenance and supply systems, facilities, and data systems to logistically support the aircraft. Where such derivative aircraft can satisfy the needs of the military and their acquisition and contract logistics support provide advantages, the Air Force will continue to acquire commercial derivatives with contractor logistics support. The background information following is included to provide an understanding of the programs for the aircraft systems analyzed in this study in order to relate the recommendations made in the report to future acquisitions of commercial derivative aircraft and logistics support.

A. KC-10 Program

1. Requirement

The need for a long-range, large-capacity tanker/cargo aircraft to operate from the United States with reduced reliance on foreign bases for refueling was stated in a formal Air Force requirement document in April 1976. The primary mission need for a new tanker/cargo aircraft is to provide mobility enhancement by (1) extending the range and payload of strategic airlift aircraft,

thus eliminating or reducing the need for enroute stops at bases on foreign soil, (2) supporting long-range deployment of tactical fighters by providing in-flight refueling and cargo airlift simultaneously, and (3) augmenting airlift forces by carrying palletized cargo and bulk fuel between major aerial ports.[1]

2. Concept Studies

In defining formal requirements for the long-range, large-capacity tanker/cargo aircraft, concept studies and flight tests were conducted to identify and analyze the alternatives for the required aircraft. The alternatives were (1) modification of the KC-135 aircraft, (2) development of new aircraft, and (3) conversion of a wide-bodied commercial aircraft to the tanker/cargo configuration. It was concluded from the results of the studies and tests that modifying the KC-135 to fulfill the long range mission requirements was impractical due to costs and technical risks, that development costs alone for a new tanker/cargo aircraft would exceed $1 billion, and that converting a wide-bodied commercial aircraft to a tanker/cargo configuration was the most feasible and cost effective solution.[2]

3. Acquisition Strategy

The acquisition strategy for the new tanker/cargo aircraft was formulated to take advantage of the commercial aircraft industry's investment in and experience with wide-bodied aircraft by (1) adapting an operational wide-bodied commercial freighter aircraft certified by the Federal Aviation Administration (FAA);

1. Comptroller General Report PSAD-68-8, Issues Concerning Air Force KC-10A Advanced Tanker/Cargo Aircraft, 5 January 1979
2. Ibid

(2) using existing commercial maintenance and supply systems, facilities, and data systems to logistically support the aircraft; and (3) maintaining commonality with the commercial counterpart. By using an existing aircraft, the research and development costs associated with the acquisition of a new weapon system are largely avoided. The use of contractor logistics support for a relatively small number of specialized aircraft, even over a 20-year period, was determined to be less costly than using a military support system.[3]

4. Source Selection and Contract

(a) Acquisition. Originally four aircraft were considered as advanced tanker/cargo candidates: McDonnell-Douglas Corporation's DC-10, Boeing Company's 747, and Lockeed Corporations's L1011 and C-5A. The L-1011 was not competitive because there was no freighter model and the C-5A was eliminated because it was out of production. The Air Force completed the competitive source selection in December 1977 and awarded a fixed price contract to Douglas effective January 1978 for engineering efforts required to convert the DC-10-30F aircraft to a KC-10 configuration. The engineering effort on the KC-10 was concerned primarily with the incorporation of aerial refueling subsystems. A series of contract options for fiscal years 1979 to 1983 were developed to allow the Air Force to order aircraft systems each year at fixed prices with economic price adjustment provisions. Options were exercised on 20 November 1978 for the completion of

3. Ibid

engineering, delivery of a test aircraft, engineering support for testing, and delivery of the first production aircraft. The contract requires the contractor to obtain FAA certification for the KC-10.

(b) Logistics Support. The Air Force requested proposals for the logistics support of the KC-10 from 20 firms, including Boeing and Douglas.[4] The Douglas proposal was more favorable than that of the nearest competitor and a contract was awarded, effective January 1978. The basic contract provided funds for logistics planning and included four options for logistics support with the price based upon the number of locations at which the KC-10 is expected to be based, the number of KC-10's at each base, and the estimated number of flights hours each aircraft is to be flown each year. The Air Force will be responsible for flight line maintenance, including engine changes, and minor inspection. Douglas will be responsible for major maintenance and inspections on a 24 hours per day, wordwide basis under peace or wartime conditions and Contractor Operation and Maintenance of a Base Supply (COMBS) at each Main Operating Base (MOB) to support the KC-10 fleet. This will include the furnishing of replacement parts with payment based on hours flown.

5. Market Situation

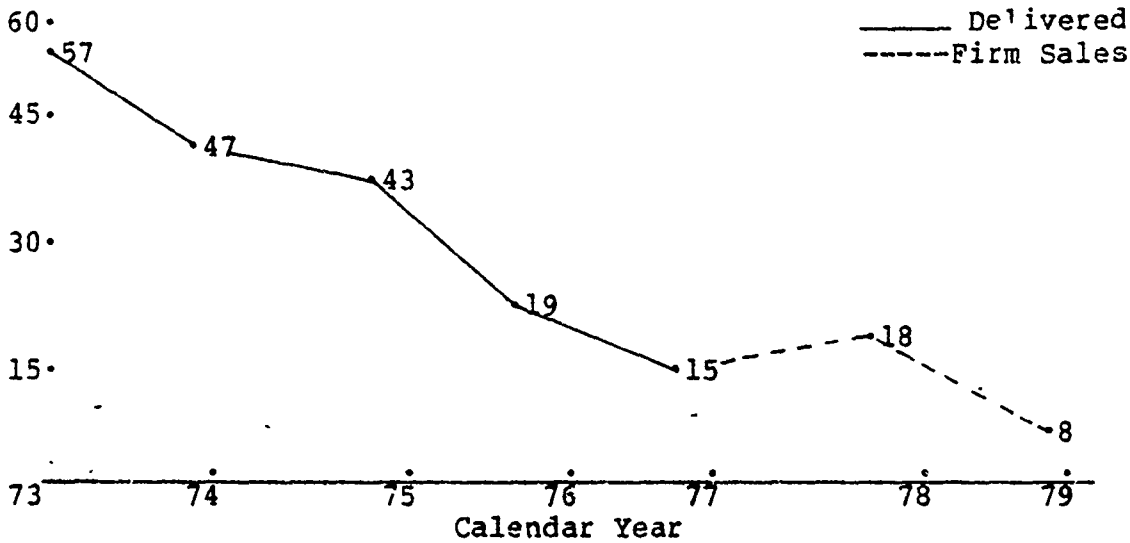
At the time of proposal preparation for the Advanced Tanker/Cargo Aircraft (ATCA), late 1976 through mid-1977, Douglas was faced with declining sales of its DC-10. Competition for the sale of wide-body jet aircraft between the Boeing 747, Lockheed

4. Interview of KC-10 Program Office Personnel by Don Sowle Associates, Inc. on 13, 14 June 1979

L-1011 and the Douglas DC-10 was intense. Although Douglas had delivered over 150 DC-10's at that time, firm sales of DC-10's for delivery in 1977, 1978 and 1979 were below economic production capacity. The result was that airplanes on the production line were being built on future sales speculation. With this market situation, Douglas was eager to win the competition for the ATCA.[5]

By 1979, the market situation for the DC-10 had turned around with increased sales through 1981. The production rate had been increased to accommodate increased sales, although it was still below the maximum capacity of the plant. To what extent this market situation would have had an impact on the Douglas proposal for the KC-10 contract if it were being submitted at a later time is unknown. Douglas may have taken a stronger position on some of the terms and conditions of the existing KC-10 contract if the market had been more favorable to them in 1977.

DC-10 Market Situation
As of September 1977



5. Interview of Management Personnel, Douglas Aircraft Company, Long Beach, California by Don Sowle Associates, Inc. on 30, 31 May 1979

6. Joint Program Office Management Philosophy

In preparing and coordinating the Request for Proposals (RFP) for the acquisition of aircraft for the ATCA mission, the Joint Program Office (JPO) made an effort to reduce the terms and conditions in the model contract to those considered necessay for acquiring a commercially developed aircraft with military modifications.[6] Offerors were encouraged to take wide latitude in their response by suggesting commercial procedures and business arrangements that could enhance the acquisition. The Statement of Work included only those requirements for compliance with military specifications and standards considered necessary by the JPO for the acquisition of a military capability. In order to more fully exploit the commercial aspects of the program, however, offerors were requested to review each detail of the RFP with the objective of improving and simplifying it. Offerors were to propose specific changes to accomplish this objective.

Requirements for data were designed to capitalize on contractor formats and FAA certification requirements. Military specifications and standards, Air Force Systems Command Design Handbooks (DH), and other military documents were identified for the most part as references for general intent and guidance. The required data, however, had to be submitted in accordance with the Data Item Descriptions (DID) as modified by the Contract Data Requirements List (CDRL). The detailed information required to satisfy the DIDs necessitated a considerable amount of documentation. Nonetheless the Joint Program Office was successful in

6. See Footnote 4

reducing the number of data items requested in the initial data call (649 items reduced to 175 items, counting duplication for the various option periods)[7] and reducing the total number of different data items for the KC-10 from that normally required for a new military system development (100 different data items compared to 300).

Joint contractor/Air Force/FAA testing in the predelivery phase was envisioned to minimize testing requirements. All tests were to be conducted against FAA criteria where FAA criteria are applicable and against Air Force requirements where the operation is not certified by FAA.

A unique approach for the KC-10 acquisition was to provide information in the RFP on the planned funding for the acquisition of the KC-10 force over six fiscal years. Offerors were requested to bid the number of total aircraft systems, including peculiar support equipment, data, training, etc. that could be fully funded for each year within the cumulative funds planned. These were the basic (Green Line) options which represented the most economical quantity that could be purchased in each year. Each year's option was to be independent inasmuch as the program funding levels could not be guaranteed. Also, each offeror was requested to bid an optimum production profile to provide the Air Force with the largest quantity of total aircraft systems that could be acquired within the total dollars planned. In addition, a Unit Price Matrix (UPM) listing prices for a predetermined yearly minimum and maximum quantity was requested for use in case deviations from the

7. See Footnote 4

basic options became necessary. This approach to pricing provided the Air Force flexibility to vary yearly quantities depending upon FY appropriation levels.

7. Pressures on Air Force Program Management

The Air Force has continually improved its system of acquisition management over the past several years with increased responsibility focused on the program manager and the program office. Although flexibility and tailoring to specific programs are key ingredients of a sound management system, managerial requirements are inherent in every major acquisition program, whether it involves a new development or the acquisition of a predominantly commercial system. Further, the program manager must provide the information required by all echelons of management, up to and including various congressional committees, from a common base of data.

Although the Air Force philosophy was to acquire the KC-10 using commercial procedures and practices wherever possible, there were serious pressures on the program manager from within all management echelons of Government to include standard DOD terms and conditions and military requirements in the RFP Model Contract including the Statement of Work. Organizations responsible for various functional areas within the acquisition agency, i.e., financial, engineering, production, logistics, etc, stated requirements for data and plans in order to maintain visibility and to track the contractors progress in their functional areas of responsibility. Since the Air Force has traditionally developed and acquired engines separately from aircraft acquisitions,

pressures were applied to the program manager to acquire the KC-10 engines separately (The program manager did not accede to those pressures.)[8] Most pressures by supporting organizations were based on procedures which had been codified over the years for the acquisition of military systems or on those MIL standards and specifications which were stated to be mandatory for Air Force use.

Such pressures made the task of preparing and coordinating the RFP most difficult and time consuming. In order to exploit the commercial aspects of the KC-10 program, the program manager was faced with making decisions against the advice of supporting organizations. Based on his own reasearch and analysis of commercial practices and procedures, the program manager excluded many military requirements from the RFP, while conceding to others rather than create undue friction with supporting organizations.[9]

8. JPO Organization

A Joint Program Office (JPO) reporting to the Commander, Acquisition Logistics Division, Air Force Logistics Command (AFLC), has been given overall management responsibility for the KC-10 acquisition and logistics support. The JPO is composed of personnel from both AFLC and Air Force Systems Command (AFSC). The JPO has a staff of approximately 80, including a 4-man special office located at the contractor's plant. Justification for the size of the staff is based on the need for personnel qualified in

8. See Footnote 4
9. See Footnote 4

the various functional areas to execute the management responsibilities of a major acquisition, and respond to requests for information from higher echelons of command. The size of the JPO determines the extent of management it can perform and, in order to provide communication between counterparts, it influences the size and make up of the contractor program management organization.

B. E-4 Program

1. Requirement

Expanded operational requirements identified for the Airborne Command Post system resulted in a requirement for increased Communication, Command and Control (C^3) subsystem capability. To meet the demands of an increased C^3 subsystem capability, more space, payload and power are required than can be accommodated by the EC-135J aircraft.[10] The Boeing 747 wide-bodied jet transport aircraft was acquired as an "off-the-shelf" aircraft to meet the requirements of the Advanced Airborne Command Post (AABNCP) system.

2. Acquisition Strategy

The underlying strategy for the AABNCP, to take advantage of the commercial industry's investment in and experience with wide-bodied jet transport aircraft and logistics support, is the same as that for the Advanced Tanker/Cargo Aircraft. The AABNCP was designated the E-4 system and the program was to be phased in a manner which would provide an interim, improved capability over

10. E-4A Contract Statement of Work, Contract F19628-73-C-0167, AFLC, 3 February 1973

that of the existing Airborne Command Post System (EC-135J) during the development of an advanced C^3 subsystem.

3. E-4 Acquisition Program

The acquisition the of E-4 system was planned according to the following phases:

Phase 1A-1 Purchase of three 747-200B aircraft. Modify the basic aircraft to install navigators station in the crew compartment, in-flight refueling receptacle, military compatible avionics, etc. Modifications do not include those required for the installation of mission equipment, i.e. Communications, Command and Control (C^3) subsystem.

Phase 1A-2 Remove existing C^3 subsystem from EC-135 J Airborne Command Post Aircraft and install in 747 aircraft with modifications to the aircraft to accommodate C^3 equipment (this was a competitive procurement won by E-Systems, Inc.). The system was designated E-4A and used to provide an interim advanced capability until an advanced C^3 subsystem could be developed.

Phase 1B-1 Purchase of one 747-200C aircraft to be used as a test bed for development of an advanced C^3 subsystem. This aircraft was also modified to include the navigators station in the crew compartment, in-flight refueling receptacle, avionics, etc. There are contract options for the purchase of six additional 747 aircraft.

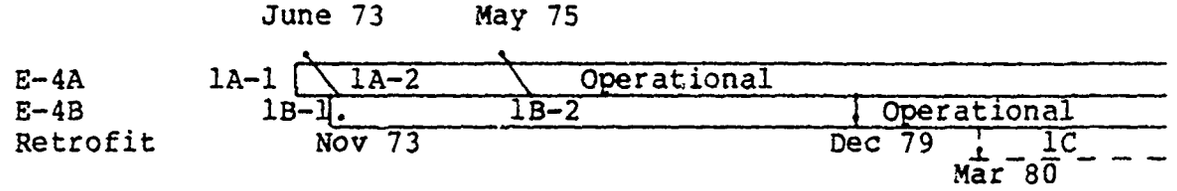
Phase 1B-2 Development of advanced C^3 subsystem with modifications to the 747 test bed aircraft to optimize the

AABNCP configuration. (Boeing won the competition for this phase of the program). This system has been designated the E-4B system.

Phase 1C Retrofit the three E-4A aircraft to the final E-4B configuration.

The first four phases of the E-4 program have been completed. Negotiations are currently underway for the retrofit of the three E-4A systems (Phase 1C). No funds are available at this time for the acquisition of additional E-4B systems.[11]

E-4 Program Time Phasing



4. E-4 Logistics Support Program

The original support contract was awarded to Boeing on 20 June 1973 by the Oklahoma City Air Logistics Center, AFLC to establish a Contractor Operated and Maintained Base Supply (COMBS) at Andrews AFB, Maryland, to support the three E-4A systems.[12] A follow-on contract transferred the COMBS to Offutt AFB, Nebraska in August 1977.[13] This was followed by successive contracts to support the three E-4A systems and make preparation for the support of E-4B systems.

Flight line and intermediate maintenance was accomplished by the Air Force. The support contracts required Boeing to

11. Interview of E-4 Program Office Personnel by Don Sowle Associates, Inc., 1 October 1979
12. E-4A Contract for Logistics Support, Contract F34601-73-C-2856, AFLC, 8 June 1973
13. E-4A Contract for Logistics Support, Contract F34601-77-C-2913, AFLC, 1 October 1977

operate the COMBS to support a utilization rate of 45 to 150 flight hours per month per aircraft, make available and maintain a bench stock of high usage nonrecoverable type items, wash and lubricate the aircraft when directed by the ACO, and accomplish over and above work, including depot repair, as ordered by the ACO.

C. C-9 Logistics Support Program

The U.S. Air Force, through the Aeronautical Systems Division (ASD) of the Air Force Systems Command (AFSC) issued a Request for Proposal (RFP) on 13 May 1967 to three prospective contractors for a subsonic, jet powered aircraft system (CX-2) to accomplish the aeromedical evacuation mission being performed by the Military Airlift Command. The RFP stated "Notwithstanding the requirements for equipment, performance, maintainability, reliability, etc. that may be expressed in subsequent sections of this RFP, it is the desire of the U.S. Air Force to take full advantage of the 'off-the-shelf' status of your existing system. ....It is neither intended nor desired that the bidder enter into substantial redesign effort in order to completely comply with requirements of this RFP."[14]

The RFP also included a requirement for logistics support which would be in consonance with the "off-the-shelf" concept of the CX-2 program. The RFP stated that "Further, maximum use of the commercial 'off-the-shelf' support concept based on fully qualified equipment is also an important consideration."

14. Request for Proposal, F33657-67-R-1078, AFSC

Logistics support proposals for the CX-2 were to address two different approaches; a contractor management support concept and an Air Force management support concept. The first approach envisioned maximum reliance on the resources of the contractor with the intent to minimize expenditures for spares, aerospace ground equipment (AGE), and manpower resources consistent with the dollar value of the small number of aircraft involved. The proposal was to be separately priced to cover a five year period in yearly increments based on the availability of the initial eight aircraft followed by additional acquisition of five and ten aircraft of the same configuration. The proposal was to include the first eight aircraft with the next quantity of five being based at Scott AFB, Illinois and the additional ten aircraft being based at two overseas stations, one in Europe and one in the Far East area. Under this concept, the contractor would:

1. Operate and maintain a base supply type organization in the vicinity of Scott AFB, and at overseas locations as required.

2. Deliver required spares and repair parts to users within 30 minutes of request, 24 hours a day, seven days a week.

3. Determine the range and quantity of all spares and repair parts to be stocked and issued from the base supply organization.

4. Maintain depot type back-up stocks to replenish base supply type spares.

5. Maintain a complete depot level maintenance capability. Organizational and field level (remove and replace) maintenance to be performed by the using Command at the home station.

6. Identify, furnish, maintain and support peculiar Aerospace Ground Equipment (AGE) for organizational and field levels.

7. Develop procedures to account for, control, and manage the Contractor Support package.[15]

Under the Air Force management support concept, logistics support would be provided through an Air Force System Support Manager (SSM) of AFLC who would serve as a focal point for all logistics actions necessary to support the program. Air Force responsibilities are as follows:

1. AFLC would accomplish normal provisioning of a total range of initial spares required to support the system in accordance with the approved maintenance concept.

2. Spare parts and assemblies selected to support the system, as well as field level maintenance, would be managed within the standard Air Force Base Supply System.

3. Contractor augmentation of the AFLC depot level supply system would be the responsibility of and determined by the SSM.

4. Maintenance would be in accordance with the normal AF three levels of maintenance (organizational, field and depot). Using commands would be responsible for organizational and field levels and AFLC would be responsible for and manage depot level support.

Source selection was accomplished by ASD and separate contracts were consumated with Douglas for the DC-9 to become the Aeromedical Evacuation Aircraft (C-9) and for its logistics support based on the contractor management support concept. The

15. Ibid

logistics support contract was awarded, effective 10 August 1967, by the Directorate of Procurement and Production, San Antonio Air Materiel Area (now San Antonio Air Logistics Center), Kelly AFB, Texas.

CHAPTER III - FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis of contracts for KC-10 and E-4 aircraft systems acquisition together with contracts for their logistics support, and the logistics support contract for the C-9 aircraft system are addressed in this Chapter. Inasmuch as the Air Force acquisition of a major item of ground support equipment, the Diesel Engine Driven Generator, presented a different set of problems and conditions than the aircraft systems acquisitions, the results of the analysis of that acquisition are presented separately in Chapter IV.

Although the Air Force was innovative in structuring the acquisition and logistics support programs for the aircraft systems analyzed in this report, the resulting contracts imposed requirements which contractors do not face in selling commercially developed aircraft and support to airlines. Each contract contains the General Provisions required for all Government contracts over $10,000. These provisions are required by law or Executive Order, or are imposed by the Department of Defense and not found in contracts for commercial acquisitions. Also, a number of military requirements were included in the contract statements of work which created additional administrative burden. These and other differences between Government practices and commercial practices in acquiring commercially developed aircraft systems and logistics support are discussed and recommendations are made for revisions to Government policies for buying commercial products and contractor support for those products.

A. Mandatory General Provisions

Each of the acquisition and logistics support contracts studied contain approximately 100 General Provisions.[1] Additionally, about one third of the General Provisions are required to be flowed down to the subcontracts for Government acquisition and contract support.[2] Twenty-one of the provisions required for subcontract flowdown are socio-economic, environmental or national policy provisions which are required by law or Executive Order for all contracts and subcontracts over $10,000.[3]

NUMBER OF CONTRACT GENERAL PROVISIONS

	KC-10	E-4A	E-4B
Acquisition Contracts	99	98	96
	KC-10	E-4	C-9
Logistics Support Contracts	106	110	92

Discussion. The DOD procurement process has been utilized to an ever increasing degree as the vehicle for the imposition of national policy, primarily in the socio-economic area, through Federal statutes and Executive Orders. As a result, the number of mandatory terms and conditions required for DOD contracts continues to grow at a significant rate.[4] The Defense Acquisition Regulation (DAR) and its predecessor, the Armed Services Procurement Regulation (ASPR), were codified over the years for the

1. C-9 Contract F41608-68-C-0001, AFLC, 10 Aug 1967
   E-4 Contract F19628-73-C-0167, AFSC, 3 Feb 1973
   E-4 Contract F34601-73-C-2856, AFLC, 8 Jun 1973
   KC-10 Contract F33700-78-C-0001, AFLC, 3 Jan 1978
   KC-10 Contract F33700-78-C-0003, AFLC, 3 Jan 1978
2. Defense Acquisition Regulation (DAR)
3. Ibid
4. John A. O'Hara, Director of Contract Policy, The Boeing Company, letter to Don Sowle Associates, Inc., November 27, 1979

acquisition of supplies and equipment that are to be developed and produced to military and Federal specifications. No provision has been made for general provisions that apply specifically to commercial products.

General Provisions are standard contract clauses (boilerplate) which are superimposed on product-related objectives. Some of the clauses have been included to predetermine the rights of both contractual parties, particularly in the event of unplanned developments, such as the clauses for Changes, Variation in Quantity, Pricing Adjustments, etc. Other clauses establish the rights of the Government and have been standardized to assure fair treatment to all contractors, e.g. Data Requirements, Data Rights, Termination for Convenience of the Government, etc. However, a number of mandatory contract clauses are designed to achieve national socio-economic objectives, eg. Small Business Sub-contracting Program, Utilization of Minority Business Enterprizes, Employment of the Handicapped, etc., or are included to protect selected segments of industry or foster the defense industrial base, e.g. Required Source for Jewel Bearings, Required Source for Miniature and Instrument Ball Bearings, Preference for U.S. Flag Carriers, etc. While socio-economic and industry protective clauses reflect worthwhile national objectives, they are meaningless when applied retroactively to purchases of off-the-shelf products which have already been produced.[5]

5. Interview of management personnel, Douglas Aircraft Company, by Don Sowle Associates, Inc. on 30-31 May 1979

When these clauses are applied to the acquisition of aircraft and components that are being produced in the same production line with commercial aircraft, it is impractical to impose a special set of conditions for some of the items on the production line and not to others.[6]

The General Provisions in the contracts for acquisition and logistics support of the commercially developed aircraft studied reflect a major difference in Government and commercial practices. They created problems and an administrative burden for contractors in that each clause had to be evaluated for impact on commercial practices, most of them with legal counsel, and imposed on suppliers of commercial parts and components where flowdown was required. (See Appendix for list of General Provisions)

Facts and Observations. Mandatory General Provisions are reluctantly accepted by prime contractors since there does not appear to be any alternative in selling their products to the Government. But they question application of many of the provisions to commercial systems and components that are off-the-shelf or are imposed on a few items in a regular production line.[7]

Historically, aircraft manufacturers maintain long term agreements with suppliers for materials, parts and components.[8] Most of these agreements are developed through competitive negotiation during the development phase of the commercial

6. Ibid
7. Ibid
8. Douglas Aircraft Company, Procurement Terms, Conditions and Special Provisions, 1 August 1976

aircraft. Douglas, for example, has basic agreements with approximately 20 suppliers of major components and purchase agreements with about 170 suppliers of high-dollar value equipment for the DC-10. The components and equipment purchased under these agreements are level priced over the estimated program quantities and non-recurring costs are amortized over agreed upon quantities.[9] These agreements contain a provision that in the event of sales of aircraft to the Government, an amendment to the agreement would be made to include the applicable provisions required to meet Douglas' obligations under the Government prime contract. Even with that provision, the Government clauses which were to be included in subcontracts required extensive negotiations with suppliers because of questionable applicability and administrative costs. The problems of negotiating Government required clauses with suppliers who do not have other Government business were more pronounced than with those who do.[10]

Both the Douglas DC-10 and the Boeing 747 aircraft required some modifications to convert them to the military KC-10 and E-4 systems respectively. Each system, therefore, is a composite of the basic airplane and modifications. In view of this composition, component parts are identified as either peculiar or common items. Peculiar items are those required to convert the basic airplane to the military configuration while common items are standard to the basic airplane. All of the General Provisions of the prime contract required for flowdown had to be included in subcontracts for peculiar items whereas they were waived for

9. See Footnote 5
10. See Footnote 5

subcontracts for common items except for those clauses required by law or Executive Order.[11] Since approximately 21 of the 35 clauses required for flowdown are required by law or Executive Order, not much relief was given to the prime contractor pertaining to flowdown to subcontracts for common items. Based on the breakout of common and peculiar items, Douglas had to develop and negotiate with suppliers five different sets of terms and conditions, i.e. for component parts for the DC-10, KC-10 common, KC-10 peculiar, KC-10 support common items and KC-10 support peculiar items.[12]

The problems of flowdown to subcontractors, where there is a breakout of common and peculiar component parts for which different terms and conditions are to be applied, are compounded by lack of decisiveness regarding the term "subcontract".[13] There is no standard definition of "subcontract" or "subcontractor" in the Federal statutes or regulatory material. The DAR provides in 7-103.1, Definitions, that "except as provided in this contract, the term 'subcontract' includes but is not limited to purchase orders, changes and/or modifications thereto." Other definitions of the term are found in various clauses and sections of the DAR. The general inference that a subcontract must be in direct support of the prime contract is not considered to be adequate for the acquisition of commercial systems manufactured for DOD incidental to and integrated with manufacturers' regular production.

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11. See Footnote 1
12. Douglas Aircraft Company Internal Memorandum, Flowdown Provisions for Purchase Orders Issued Under ATCA Prime Contract, 1 March 1978
13. See Footnote 5

Douglas, for example, purchases parts and supplies to feed its DC-10 production line, which includes a few aircraft that will be converted to KC-10s. Since these parts and supplies are commingled, those to be incorporated in airplanes that will become KC-10s cannot be discreetly identified. The lack of a definition of "subcontract" which clearly excludes purchases for inventory or the production line leads to problems of application.[14]

Many problems in accomplishing subcontracts with suppliers of hardware for the KC-10 aircraft were due to lack of familiarity initially with Government contract requirements on the part of Douglas commercial buyers who purchase DC-10 hardware.[15] To resolve these problems, a series of special training programs for those buyers were established by Douglas. The special training sessions for approximately 120 buyers, together with the cost of key personnel to develop training material and instruct, all related to the acquisition of the KC-10, generated cost to Douglas. Because the cost of this activity was not specifically accounted for, it was difficult to arrive at a total cost impact although salaries and fringe benefits of the personnel involved was estimated at $115,000.[16].

The socio-economic, environmental and national policy clauses required by Law or Executive Order to be included in subcontracts apply to the purchase of both common and peculiar items. Since these clauses are superimposed on product-related objectives,

14. See Footnote 5
15. Douglas Aircraft Company Memorandum, Buyer Training Program, 18 December 1978
16. See Footnote 5

their primary impact is one of administrative burden for both the prime and subcontractors. They pertain to employment practices, subcontracting with small and minority business, record keeping, reporting, and similar actions which increase the cost of doing business. They increase management manhours to review, determine actions to be taken, develop special actions where required, coerce subcontractors to accept a special set of terms and conditions for meeting Government contracts, and to participate in Government surveillance visits and audits. The objectives of these requirements are laudatory but their application and benefit in buying commercial systems and products is questionable.

Conclusions

1. Many of the standard General Provisions required by law, Executive Order, or imposed by DOD in all Government contracts over $10,000 are of little if any benefit to the Government when included in contracts for commercially developed systems.[17] Most of them are irrelevant inasmuch as they cannot be applied retroactively to products already produced (off-the-shelf) and they are difficult to enforce when applied to products being produced in regular production, only a portion of which is purchased by the Government. These provisions, in the aggragate, create a significant administrative burden to contractors who have developed and are producing commercial systems using established commercial practices or to contractors providing logistics support integrated with logistics support for commercial counterparts. Recognizing that many of the provisions have the purpose of protecting the economic well-being of the country, they are

17. See Footnote 5

ineffective in that regard when applied to the acquisition and logistics support of commercially developed systems. Their inclusion in such contracts increases the Government and contractors cost of overhead as well as direct costs in providing or producing commercial systems or products for the Government without corresponding benefit.

2. Commercial products are either manufactured for off-the-shelf sale or for sale from regular production from stocks of raw materials and in-process inventory of parts and supplies not necessarily procured for any particular contract. Commercial products being manufactured for DOD, incidental to and integrated with a manufacturer's regular production, should be treated as the other products being produced.[18]. To clarify the application of contract requirements to subcontracts, a policy concerning subcontracts for commercial products is needed.

Recommendation:

1. It is recommended that DOD develop, and publish in DAR Section VII a set of General Provisions tailored to contracts for acquisition and logistics support of commercially developed systems. For commercial systems and components which are to be purchased off-the-shelf (already produced or being produced in regular production), the following contract general provisions are proposed as those basic clauses which should be required. They define the rights and obligations of the contracting parties, while omitting those general provisions which are not applicable

18. See Footnote 5

Definitions. (DAR 7-103.1)

Inspection. (DAR 7-103.5)

Payments. (DAR 7-103.7)

Discounts. (DAR 7-103.14)

Officials Not To Benefit. (DAR 7-103.19)

Covenant Against Contingent Fees. (DAR 7-103.20)

F.O.B. Origin. (DAR 7-104.70), and

F.O.B. Origin. Government Bills of Lading and Prepaid Postage (DAR 7-104.85)

or

F.O.B. Destination. (DAR 7-104.71), and

F.O.B. Origin. Evidence of Shipment (DAR 7-104.76)

The following clauses should be included when applicable:

Changes. (DAR 7-103.2)

Title and Risk of Loss. (DAR 7-103.6)

Assignment of Claims. (DAR 7-103.8)

Federal, State and Local Taxes. (DAR 7-103.10(a)

Termination for Default. (DAR 7-103.11)

Disputes. (DAR 7-103.12(a)

Termination for Convenience. (DAR 7-103.21(b)

Responsibility for Inspection. (DAR 7-103.24)

Commercial Bills of Lading Covering F.O.B. Origin Shipments. (DAR 7-103.25)

Pricing of Adjustments. (DAR 7-103.26)

Rights in Data. (DAR 7-104.9)

Examination of Records by the Comptroller General. (DAR 7-104.15)

Progress Payments. (DAR 7-104.35)

Interest. (DAR 7-104.39)

Limitations of Liability. (DAR 7-104.45(a)

Material Inspection and Receiving Report. (DAR 7-104.62)

F.O.B. Origin - Minimum Size of Shipment. (DAR 7-104.72)

Loading, Blocking and Bracing of Freight Car Shipments. (DAR 7-104.73)

Shipments to Ports - Clearance and Documentation of Requirements. (DAR 7-104.74)

Diversion of Equipments Under F.O.B. Destination Contracts. (DAR 7-104.75)

Notice of Radioactive Materials. (DAR 7-104.80)

F.O.B. Origin - Government Bills of Lading and Mailing Indicia. (DAR 7-105.85)

Approval of Contract. (DAR 7-105.2)

Report of Shipment. (DAR 7-105.4)

No other General Provision Clauses should be inserted without specific approval of a contract approval authority higher than the contracting officer.

2. It is recommended that the following policy be included in the DAR: "Any others, however described, placed by manufacturer

with vendors/suppliers for parts and/or components used in the manufacture of commercial products for sale from stock or from regular production shall not be considered subcontracts for the purpose of flowing down to subcontractors those conditions required to be imposed on subcontractors by Government prime contracts."

B. Military Requirements of the Statement of Work

All of the requirements of the Statement of Work reflect differences in the acquisition of the KC-10 and E-4 aircraft from normal commercial practices. A majority of these requirements, however, so closely paralleled commercial practices for the DC-10 and 747 aircraft that they caused no major problems in compliance. Therefore only those requirements that illustrate significant differences from commercial practices will be discussed in this section.

The Statement of Work for the Logistics support contracts studied addressed primarily the support tasks to be acomplished, rather than requirements for military standards.[19] Douglas and Boeing do not normally provide supply and maintenance support for aircraft purchased by commercial customers (airlines maintain their own logistics support systems), although they make new replacement parts available. Therefore, it is difficult to make a direct comparison between Government contract and commercial practices for logistic support. There is, however, a comparison of the KC-10, E-4 and C-9 logistics support contractual requirements included in subparagraph D.

19. See Footnote 1

Discussion

Most of the military specifications and standards included in the KC-10 and E-4 Statements of Work pertained to the modifications of the basic airplane.[20] Management plans as well as other military requirements, on the other hand, encompassed the development and production of the complete aircraft system. The intent of the Government was to make maximum use of company practices and contractor formats for the documentation required.[21] Nevertheless, the contractors were required to comply with the criteria of listed military specifications and standards and to report in accordance with Data Item Descriptions (DID) as modified by the Contract Data Requirments List (CDRL).

Facts and Observations

The following facts and observations address specific requirements of the contracts Statements of Work. While the impact of individual items may appear to be picayunish, together they create a significant impact on the contractor, increasing his cost to deliver the systems to the Air Force.

1. Aircraft Modifications

Two different sets of conditions were applied to the acquisition of a single aircraft system, i.e. applications of commercial standards for the basic airplane and military standards for the modifications. Modifications to convert the DC-10 to the KC-10 were primarily for the installation of the aerial refueling

20. See Footnote 1
21. KC-10 Request for Proposal F33657-76-R-9751 (AFLC, 3 August 1976)
E-4 Contract F19628-73-C-0167 (AFSC, 3 Feb 1973)

subsystem and fuel storage cells. Since the KC-10 is estimated to be 88 percent common with the DC-10, the modifications can be considered to be a relatively minor part of the total system.[22] Likewise modifications to the 747 aircraft under the acquisition contract were primarily for installation of an in-flight refueling receptacle and navigators station in the crew compartment and considered to be relatively minor. Conversely, the modifications to convert the 747 aircraft to the E-4 configuration pertaining to the accommodation of the communications, command and control (C^3) subsystem were considered to be major and were accomplished under separate contract.

Analyses of the acquisition programs for both aircraft system, including modifications, surfaces the question of the most effective contract arrangement to accommodate modifications. The draft Federal Acquisition Regulation (FAR) defines a commercial-type product as a "commercial product modified with some Government peculiar physical change or addition and/or otherwise identified differently than its normal commercial counterparts."[23] No policy, however, has been established for the acquisition of commercial-type products nor has the amount of modification been established whereby a commercial product should no longer be considered a commercial-type product.

Conclusion

The application of commercial standards to the basic airplane and military standards to the modifications complicates the

22. See Footnote 5
23. Federal Register, page 55912, Friday September 28, 1979, Notice of Availability and Request for Comment, FAR Parts 10 and 11

acquisition. To take advantage of the gains to be realized in acquiring commercially developed aircraft, the basic airplane and minor modifications should be acquired in accordance with commercial standards and practices. This policy would simplify the acquisition and permit the use of a firm fixed price contract with good definition of price. When modifications are extensive, they should be segregated and contracted for under the most appropriate arrangement to facilitate development, control, and contractor incentive.

Minor modifications to commercial products should be considered as customizing without applying additional contract requirements from those normally included in commercial purchases. An appropriate threshold should be established for this purpose. Since cost and pricing data are not required for items sold at catalog or market prices when sales to the Government are less than 45%, DAR Manual #1, Chapter 8A, and the Goverment share of the contractor's weighted average share in cost risk policy is set at 25% threshold, DAR Section 3, Part 10, it may be appropriate to establish the median between those two figures (35%). This would be an appropriate threshold for considering a modified commercial product to be contracted for as a commercial product.

Recommendation

It is recommended that the definition of a commercial type product in the proposed FAR Part 11 be supplemented in the Air Force or DOD FAR implementing directives by adding the following:

"Contracts for commercial type products, where modifications represent less than 35% of the commercial item price, may be considered to be commercial product contracts with respect to the statement of work and other terms and conditions.

2. Specifications, Standards and Data Item Description

The management philosophy of the Air Force for the acquisition of the KC-10 and E-4 aircraft systems was to rely on FAA standards and established commercial procedures and use military standards only when there were no applicable FAA or commercial standards or when such standards do not meet Air Force needs.[24] The rationale for requiring military standards in lieu of FAA or commercial standards was based on the safety orientation of FAA standards rather than performance. When performance was a prime consideration, military standards were imposed.[25]

With this approach, the Air Force was successful in limiting the number of military specifications and standards as contractual requirements, in contrast to requirements for a new military system development. For example, the Statement of Work for the KC-10 acquisition called out 20 different military specifications and standards; 10 were referenced for guidance and the remaining 10 were specific requirements. The 20 military specifications and standards contained in the Statement of Work for the KC-10 are balanced against a nominal 200 military specifications and standards required for the new development of military aircraft weapons systems. In commercial practices, the contractor is required to develop aircraft in accordance with nine FAA specifications and standards.[26]

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24. See Footnote 21
25. Interview of KC-10 Program Office personnel by Don Sowle Associates, Inc. on 13-14 June 1979
26. "Federal Government Business Aspects Which Entail Unnecessary Expense", paper prepared 27 October 1975.

The Air Force was also successful in limiting the data requirement for the acquisition of commercial derivative aircraft compared to the requirements for a new military system development. Even so, the requirements for documentation and reporting far exceeded the required in normal commercial practices. Again, the Contract Data Requirements List for the KC-10 acquisition contains approximately 100 different data requirements. Although there are more data items on the list, some are repeated throughout the various phases of the program. The 100 different data items required for the KC-10 acquisition compare to an average of 300 different data items required for new development.[27] No data reporting requirements similar to DIDs are levied on the contractor by FAA or commercial customers although the contractor comparison of requirements for specifications and standards, Data Item Descriptions is shown on Table 1.

Table 1

Comparison of Military and Commercial Requirements

	New Military Development	KC-10	Commercial Customers
Specs & Standards	200	20	9
Data Item Descriptions	300	100	0*

*Under commercial contracts, manufacturers normally make available manuals (maintenance, flight crew operations, wiring diagrams, etc.) publications (parts list, weight and balance report, etc.) and engineering documentation (drawing index, set of Douglas Standards, etc.) but are not required to provide management plans, periodic progress reports, and other documentation such as required by the CDRL.

27. Ibid
28. See Footnote 5

Conclusions

Although the Air Force was successful in limiting the application of military specifications and standards and requirements for data, the limited application to the acquisition of commercial derivative aircraft changed the complexion from a commercial to a military procurement.

Recommendation

DOD should conform to FAA requirements and established commercial procedures for the acquisition of derivatives of commercial aircraft when the derivatives are to be FAA certified. When the modifications to commercially developed aircraft are extensive and the military-unique modifications require conformance with military specifications and standards, those modifications should be segregated and contracted for separately.

3. Management Plans

The SOW for the KC-10 acquisition contract required the contractor to prepare and submit 19 management plans for Air Force approval.[29] The Human Factors Test and Evaluation Plan was submitted as an annex to the System Test and Evaluation Plan, and the Reliability and Maintainability Plans were combined, leaving a total of 17 management plans.

Military Specifications and Standards and AFSC Design Handbooks were referenced for general intent and guidance for the preparation of management plans. The Air Force agreed to accept

29. See Footnote 21

the contractor's format. However, the information required for each plan was specified by a DID as modified by the CDRL, resulting in considerable documentation.

The contractor's management procedures are documented in a number of company handbooks and publications and are annually reviewed by the FAA.[30] Various functional groups within the company, i.e., engineering, pricing, scheduling, etc., each have their own specific procedures documented in company publications and directives. In preparing management plans which satisfy information requirements of the DIDs, the individual responsible for the plan had to collect information from a number of company source documents. Although the information required is available in some form, the integration of data into a management plan was time consuming.

The contractor's KC-10 program engineering group was responsible for the preparation of all management plans with the exception of the Integrated Support Plan and Technical Order Publication Plan, these totaled 15 management plans. The 15 plans consisted of over 700 pages. The initial preparation of the 15 plans and the rework to obtain Air Force approval consumed over 7,000 manhours of effort on the part of the program engineering group. In addition, the manhours required of Douglas management, and the illustration and publication personnel made the total effort come to over 10,000 manhours. Also, a number of unrecorded contractor manhours were expended in reviewing and discussing the plans with Air Force personnel.

30. See Footnote 5

TABLE 2

MANAGEMENT PLAN PREPARATION
Manhour Requirement - KC-10 Program Engineering Group

Plan	Pages (Actual)	Hour/Page (Est.)	Initial Preparation	Rework (Est.)	Total Manhours
Test & Evaluation	88	10	880	400	1,280
Production	63	5	315	100	415
Facilities Requirement	72	5	360	100	460
System Engineering Management	26	7	182	100	282
Configuration Management	42	10	420	180	600
Human Engineering Program	33	7	231	100	331
System Safety Program	52	7	364	160	524
Electromagnetic Compability	74	8	592	160	752
Reliability and Maintainability	61	7	427	160	587
Photographic	6	8	48	8	56
Mass Properties Control	14	10	140	40	180
Corrosion Prevention and Control	10	8	80	16	96
Aircraft Structural Integrity Program	91	10	910	200	1,110
Damage Tolerance and Durability Assessment	33	10	330	120	450
Support Equipment	36		252	100	352
	701		5,531	1,944	7,475

Add 33 1/3 percent for management and publications manhours required, resulting in a total of approximately 10,000 manhours for preparation of 15 management plans.

Other management plans required, but not included here because data was not collected, are the Integrated Support Plan and the Technical Order Publication Plan.

Source: KC-10 Program Engineering Group, Douglas Aircraft Company

The Air Force rationale for requiring management plans was two-fold: the requirement to manage the expenditure of large amount of appropriated dollars and the need for information to respond to inquiries from higher echelons of command and from Congress.[31] A program manager of a major program is required to provide periodic review briefings of his program to Headquarters Air Force and to the Office of Secretary of Defense. The various review offices have interests in different aspects of acquisition and the briefer is expected to answer all questions on any aspect of the program. Congressional interest requires that a program manager be knowledgeable of the details of the acquisition. He is expected to have a method of tracking contractor progress and of detecting and correcting problems before they become acute. These requirements of a program manager, particularly in the political environment of large acquisitions, are demanding. Such expectations motivated the KC-10 program manager to require detailed management plans from the contractor.[32]

Commercial customers do not require specific management plans covering the contractor's procedures for managing the development and production of the airplane. From the contractor's point of view, the requirement for management plans by the Air Force reflects excessive documentation and checking of the contractor's ability to manage a program, particularly after he had developed, produced, certified and flown a large number of airplanes of the commercial version.[33]

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31. See Footnote 25
32. See Footnote 25
33. See Footnote 5

The SOW for the E-4 acquisition (Phase 1A-1, Aircraft Portion) required seven management plans for approval. A comparison with the KC-10 acquisition is not applicable in view of the separate contract (in this case, a different contract) for the installation of the C^3 subsystems in the 747 aircraft.[34] The impact on the contractor, however, was of the same nature, i.e. additional administrative burden. The problems of preparing management plans for the E-4 program was compounded since the Air Force works with the Boeing aerospace organization who in turn deals with the Boeing commercial airplane organization for the production of the basic airplane.[35]

Conclusions

The documentation and reporting requirement for the acquisition of both the KC-10 and E-4 were excessive compared to the requirements of commercial customers. The requirements, for the most part, pertained to documentation of company procedures for planning and managing the production and modification of commercially developed aircraft.

Recommendation

DOD should take advantage of the contractor's established commercial practices relative to a commercially developed and proven aircraft by eliminating the requirement, and cost, for documenting company management practices in accordance with military data item descriptions.

34. Interview of E-4 Program Office personnel by Don Sowle Associates, Inc. on 1 October 1979
35. Ibid

4. Configuration Management

The Air Force maintained configuration control over the acquisition of the KC-10 and E-4 aircraft systems. The contracts require that configuration management plans comply with the criteria of MIL-STD-483 and that Engineering Change Proposals (ECP) be processed in accordance with that standard. Similar requirements were included in the Statement of Work for the KC-10 Logistics Support contract to provide for changes after aircraft delivery.

Proposed changes that would effect aircraft specifications, requirements, price, delivery schedules, specified weight or performance, specified interchangeability requirements, maintenance or logistics support concepts, or require reidentification of spare parts or assemblies, are to be processed as Class I ECPs.[36] Proposed changes that do not fall within the Class I criteria (Class II changes) may be made without Air Force approval provided a Specification Change Notice is submitted to the Air Force concurrent with release of the change from engineering for concurrence in classification.

The configuration for the KC-10 was based on the basic DC-10-30F specifications, changed to include the modifications required for the KC-10. Changes to the specifications during the development and production of the first article were required to be processed as either Class I or Class II ECPs. After the Predelivery Design Review, all changes were to be processed as Class I ECPs.

36. See Footnote 1

For the modifications to the 747 aircraft in the E-4 program, the contractor was required to document the Product Configuration Identification for each configuration item with a product specification. Authentication of each product specification by the Air Force then established the product configuration baseline. All Class I changes to the Product Configuration Identification before the establishment of the baseline were processed as compatibility or record only ECPs.[37] All changes after the baseline was established were to be processed as Class I ECPs for the E-4A aircraft whereas they may be processed as either a Class I or Class II ECPs for the E-4B aircraft. For both E-4 aircraft, Service Bulletins were to be processed as an ECP. (This requirement was eliminated for the KC-10).

Routine Class I changes (other then Emergency, Urgent, or Compatibility Changes) proposed by the contractor required an Advanced Change/Study Notice (ACSN) to be submitted and approved by the Air Force before any effort could be started on the preparation of the ECP. The ACSN includes an identification of the item affected, an explanation of the need for the change, a technical description of the modification or study needed in sufficient detail to convey an understanding of the problem to be corrected, a listing of alternative ways to meet the need for change noting the desirability and cost estimates for each, and a cost estimate for development and production of the proposed change. With approval of the ACSN, the contractor is authorized

37. See Footnote 34

to develop the ECP which provides detailed engineering data and drawings for evaluation. A not-to-exceed price and other information for contractual purposes are required with the ECP.

Processing time for a routine Class I or II ECP, including the submission of an ACSN, varies with the complexity of the change. The average processing time is three months. Considerable detailed documentation is required. Other than the time and effort required for preparation and processing of documentation, the development of firm pricing prior to approval of the ECP and accomplishment of the change presents a problem.[38] It is tantamount to establishing a fixed price for a development project where adequate coverage of contingencies must be assumed. In view of the unique Unit Price Matrix for the KC-10, it is particularly troublesome for Douglas to establish a firm fixed price for changes that will impact aircraft systems to be produced in the outyears.[39]

The contractor maintains an organization responsible for implementing the requirements of configuration management using company developed, FAA approved practices. He prepares the configuration item specifications and drawings, maintains specifications and conducts configuration audits. For commercial sales, Class II changes are determined by the producer and customers may or may not be notified, depending on the nature of the change. For proposed Class I engineering changes, customers are notified of the proposed change with adequate information

38. See Footnote 5
39. See Footnote 5

on the advantages and estimated cost of the change for a full understanding without all of the detailed engineering data on how the contractor will accomplish the change. A statement of interest is solicited and if most customers desire the change, the contractor incorporates it.[40]

Conclusion

Rigorous configuration management with full documentation of configuration changes is a necessity for purposes of logistics support. For the acquisition of commercially developed aircraft where modifications are made for the military operation of the aircraft, early establishment of a configuration baseline followed by imposing the military ECP process for change approval complicates the contractor's modification program.

Recommendation

For the case of acquisition of derivatives of commercial aircraft under a fixed price contract where mission performance is specified, allow the manufacturer to retain control of the configuration up to the point of final configuration of the first article. Where changes are found to be necessary or desired that impact cost or performance, accept company papers for evaluation and change approval rather than military ECP paper. The DOD program manager must assure that the contractor has adequate configuration management procedures, including real time documentation of changes.

40. See Footnote 5

5. Support Equipment

The acquisition contracts for the KC-10 and E-4 aircraft required the contractor to perform analyses of all operational and maintenance functions to identify requirements for support equipment (SE), also referred to as Aerospace Ground Equipment (AGE). From these analyses, a Support Equipment Recommendation Data (SERD) document was prepared for each requirement. The SERD (or AGERD) documents the functional analysis providing data on cost of ownership, base of maintenance, human engineering analysis, useful life and a technical description.

Using AGERD information, the E-4 contractor was required to screen the Federal Stock Numbered AGE or other military documented lists of support equipment for standard items of AGE in the USAF inventory that can be used as is or modified for peculiar E-4 support. Recommendations were then made to the procuring activity for AGE, which could be GFE, CFE, or a combination, with the priority of selection being (1) standard item or modifications of standard items in the USAF inventory, (2) commercial off-the-shelf or modified commercial items, and (3) as a last resort, new development.[41] The Air Force evaluated the recommendations and made the final decisions, giving contractual authorization for those items to be developed or purchased.

A baseline listing of KC-10 peculiar support equipment, together with a SERD for each item including pricing data, was

41. See Footnote 1

required by the RFP. The KC-10 contract required the contractor to submit a SERD, with pricing, for additional support items as the requirements are identified. The Air Force evaluated the SE requirement and screened the inventory for standard items in the USAF inventory. Only after new support equipment items were approved as a result of this process was the contractor authorized to proceed with detailed engineering design.

Conclusion

The Air Force maintains close control of the selection of support equipment in order to hold down costs, minimize proliferation of peculiar support equipment, and promote standardization. The SERD process, however, requires considerable documentation, including pricing for proposed new items of peculiar support equipment. The authority to proceed with detailed engineering design for those new items approved requires a specific contractual action.[42] Since aircraft manufacturers seldom build or buy support equipment for their commercial customers (airlines), no comparison of the KC-10 and E-4 support equipment process with commercial practices can be made. The contractors objections to the Government imposed process relate to the amount of documentation required, the time consumed in the process, and the need for firm fixed pricing before the equipment has been designed.[43]

42. See Footnote 1
43. See Footnote 5

Recommendation

Simplified procedures should be developed for use in establishing and evaluating requirements for support equipment for derivatives of commercially developed aircraft.

6. Computer Programs

The SOW for the KC-10 contract requires that each new computer program be managed as an individual configuration item in accordance with MIL-STD-483. For each new computer program, a development specification, a product specification, and a version description document (document for maintaining software) are to be submitted in accordance with the DIDs contained in the CDRL.

For the conversion of the DC-10-30F to the KC-10 configuration, only one new computer program was required, for the control of the Aerial Refueling Boom (ARB).[44] After the computer program is developed and the required control of the boom demonstrated, the computer will be hardwired for operational use. This type of computer program is referred to as "firmware" and is used where no changes to the operational capability, once developed, are envisioned.

MIL-STD-483 applies to the development and production of computer programs (software), primarily for configuration control where future operational changes are anticipated. The documentation required is necessary for the maintenance of the software. It is questionable[45], however, whether all of the documentation required for software is needed when the computer program is to be

44. See Footnote 5
45. By Don Sowle Associates, Inc.

hardwired into the computer for operational use of the equipment and no computer program changes can be made without a redesign of the computer.

In commercial practice, the contractor prepares a Computer Software Quality Program Plan in accordance with FAA-STD-018 which outlines the process flow, validation of technical requirements, testing, evaluation criteria, design reviews, etc. For a computer program that is to be hardwired into the computer, sufficent documentation is prepared to authenticate the program.

Conclusion

Douglas estimates that development of the computer program for operating the refueling boom on the KC-10 in accordance with commercial practices would require between 1600 and 1800 manhours. Compliance with the Air Force requirement for documentation of this program which is to be hardwired into the computer will double the manhours normally required.

Recommendation

DOD should require only that documentation necessary for assuring the proper operation of the equipment which is computer controlled.

7. Contract Work Breakdown Structure (CWBS)

The KC-10 is being produced on a common DC-10 production line with KC-10 modifications being made on-line. It is estimated that the KC-10 will be approximately 88 percent common with the DC-10-30F.[46] DC-10 aircraft are currently being produced at a

46. See Footnote 5

rate of 41 aircraft per year, of which two will be KC-10's. The contract requires a CWBS for reporting schedule performance for the KC-10. A work breakdown structure is a product-oriented family tree division of tasks which organizes, defines, and graphically displays the product to be produced, as well as the work to be accomplished to achieve the specified product. From the CWBS, the contractor must establish a Program Master Schedule, an Engineering Master Milestone Schedule, and a First Article Preproduction Schedule for the KC-10.[47] In view of the production strategy where the KC10's are intermixed with the production of KC-10's, difficulty was experienced in establishing a CWBS which would be meaningful in reporting schedule performance solely for the KC-10 aircraft.

Although the manhours expended in preparing a CWBS for the KC-10 were not specifically recorded, the contractor reported that an extraordinary amount of key personnel time was spent in developing CWBS data as required by the CDRL. The CWBS which was submitted by the contractor is not being used by the Air Force for assessing KC-10 schedule performance in deference to other progress reporting information.[48] Commercial customers do not require such detailed scheduling information.

47. See Footnote 21
48. See Footnote 23

When the Air Force acquires commercially developed aircraft from a manufacturer's regular production, commingling precludes in-line production work packages identified by specific customer aircraft.

Recommendation

Eliminate the requirement for a contract work breakdown structure when aircraft for the Government are produced on a common production line and modifications are made on-line.

C. Corollary Findings

The major findings of the study, which reflect differences between Government and commercial acquisition of commercially developed aircraft and contract logistics support, were discussed in Sections A and B above. However, a number of corollary findings of the researchers are based on issues which affect the acquisition of commercially developed systems and are addressed in this section.

Discussion

In implementing the policy for Acquisition and Distribution of Commercial Products (ADCP), it is intended that commercial practices for the acquisition and support of commercial products be used when appropriate and feasible.[49] The issues raised herein affect the Government's ability to take advantage of established commercial practices and are addressed for consideration in developing implementing policy for ADCP.

Facts and Observations

The following issues are based on the observations of the researchers conducting the study of Government acquisitions of commercially developed aircraft and contract logistics support. The impact of these issues is not quantifiable.

1. Special Data Rights. Proprietary data are closely held and controlled by commercial companies because most of them believe their survival would be threaten by disclosure of this data.

49. OFPP Memorandum, Procurement and Supply of Commercial Products, to the Administrator, General Services Administration; Administrator, Veterans Administration; and Secretary of Defense, May 24, 1976

The contracts for the KC-10 and E-4 aircraft contain a provision for "Special Rights", which gives the Government more flexibility in the use of technical data than does limited rights.

"Special Rights" is defined as rights to use or duplicate technical data, in whole or in part, within the Government, and rights to disclose or release such technical data to any potential contractors for their use (including rights to duplicate) in meeting all U.S. Government requirements except for the manufacture of spare parts. Use and duplication by the U.S. Government and such contractors shall be limited exclusively to performance of all effort involving the DC-10 or 747 type aircraft owned by the Government. Special rights also includes rights for logistics support contractors to, in turn, release and disclose technical data to subcontractors performing effort relating to the particular type aircraft.[50]

Both contracts include the Rights in Technical Data and Computer Software clause (DAR 7-104.9(a)) which provides for the acquisition of data with unlimited, limited, or restricted rights, as appropriate. It gives the Government unlimited rights to all technical data developed under the contract or subcontracts. However, the special Rights provisions requires that other data be furnished with Special Rights in lieu of Limited Rights.

The Special Rights provision proved to be a problem area for the contractor, particularly in negotiating agreements with subcontractors and suppliers.[51] Objection was based on a lack of

50. See Footnote 1
51. See Footnote 5

experience with these provisions and concern about widespread use of proprietary data. For example, Douglas has had to conduct extensive negotiations with suppliers in an attempt to obtain acceptance of this provision. Some suppliers accepted the provision only after the requirements for data rights were clarified during negotiations. Some suppliers would agree to only furnishing limited rights for proprietary data, while others found the provision unacceptable. Progress has been made although complete resolution of the requirement is yet to be obtained.

An analysis of vendors' reaction to the Special Rights provision included in the Douglas subcontracts/purchase orders revealed that 19 vendors accepted the provision during the early negotiations while 10 vendors initially offered limited rights only or found the provision to be unacceptable.[52]

Accepted	Rejected
Delco	Bendix Avionics*
Aero Products	Aero Hydraulics
Sierracin Thermal Systems	Pneu Draulics, Inc.*
Weston Instruments	Sterer Eng. & Mfg. Co.*
Moog	Ronson Hydraulics
Honeywell	Abex Corp.*
Firestone Coated Fabrics Co.	Unidentified (TACAN)
J. C. Carter	B. F. Goodrich, Eng.Syst.Div.
Unidentified (Aerial Refueling Hose Reel Assy.)	Libby-Ownes-Ford
	UOP
ARO Corp.	
Bendix Instruments	
General Electric	
Midland Ross	
Motorola	
Parker Hannifin	
Sperry	
Sundstrand Data Control	

*Offered limited rights in lieu of Special Rights.

52. Douglas Aircraft Company file, Representative Samples of Exceptions Taken by Prospective Subcontractors to Terms and Conditions

Conclusion

The right to use or duplicate technical data by the Government is necessary in order to meet the support requirements of the particular system. The rights defined in the "Special Rights" provision of the KC-10 and E-4 acquisition contracts, limiting the rights exclusively to the performance of all efforts involving the particular aircraft type owned by the Goverment, are needed for that purpose. Specifically, the "Special Rights" provision permits the Government to use the data or provide it to support contractors and subcontractors, with the limitations noted, without obtaining further release approval from the manufacturer. Technical data furnished with "limited rights" could be used for the same purpose provided the Government obtained permission from the manufacturer for its release. In view of the inclusion of a "Special Rights" provision in several Air Force contracts, the need for recognition of special rights in the DAR should be evaluated through Air Force preparation of a DAR case. If found to be needed by DOD, these rights should be formalized by inclusion in the DAR part 9 and in the clause in DAR 7-104.9. If rejected by the DAR Committee but still considered necessary, the Air Force should include appropriate coverage in an Air Force/DAR supplement.

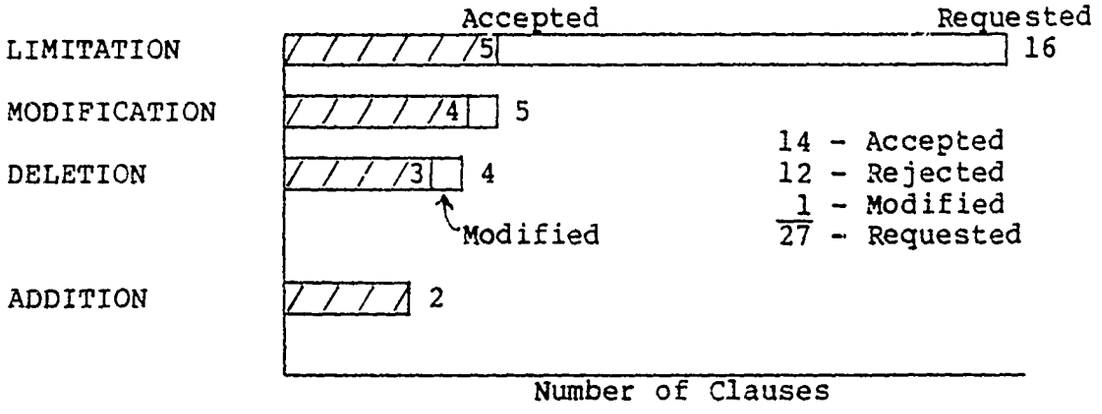
2. Waivers and Deviations

The ATCA Request for Proposals encouraged offerors to critically review each detail with the goal of improving and simplifying the acquisition and to take wide latitude in recommending

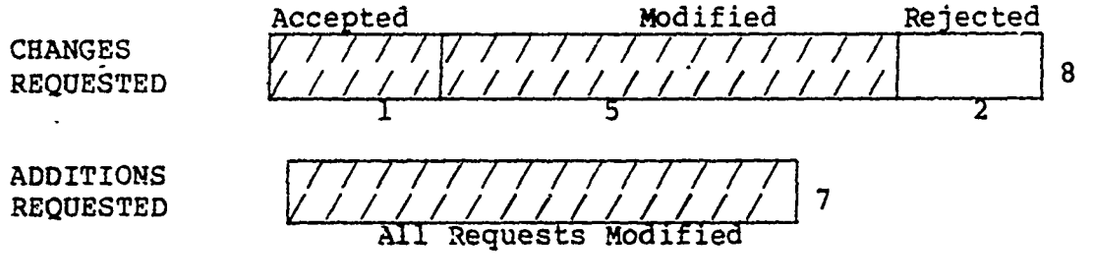
changes to any aspect of the RFP which would provide the best possible proposal based on the offeror's best business arrangement. A number of requests for waivers and modifications to the RFP terms and conditions as well as additional clauses to better fit the acquisition of commercially developed systems were experienced. For example, Douglas requested the deletion of four general provisions, modification of five, the limitation of applicability of sixteen to the KC-10 peculiar modifications, and the addition of two general provisions for their own protection. In addition, Douglas proposed changes to eight and suggested seven additional special provisions.[53]

Waivers and Deviation Actions
For KC-10 Acquisition and Logistics Support Contracts

General Provisions



Special Provisions



53. Douglas Aircraft Company Proposal 76D-150, Volume XI, Contract Terms and Conditions, 5 November 1976

The Air Force accepted over half of the Douglas requests for waivers and deviations. The need for deviations and waivers create additional work for the contractor to prepare and provide rationale for the suggested changes and additional work for the Air Force to process the requests. In processing the Douglas requests, the KC-10 Joint Program Office made those determinations of acceptance appropriate to that level and initiated actions on those requests requiring formal approval.

Conclusion

The acceptance by the Air Force of over half of the Douglas requests for waivers and deviations indicates that the RFP, although commendable in its approach to suggestions, was not tailored to the acquisition of a commercial system. The terms and conditions of the solicitation should recognize the realitics of the marketplace if the Government is to operate in a commercial environment. The use of a special set of contract terms and provisions for the acquisition of commercial products, as recommended in Section A of this chapter of the report, will, if approved, negate most of the need for waivers and deviations.

3. Service Contract Act

The logistics support contracts for the C-9, E-4, and KC-10 systems include a special provision for the potential application of the Service Contract Act. The clause states that in the event during the performance of the contract it is determined by appropriate authority that the provisions of the Service

Contract Act are applicable to any of the work covered by the contract, the Contracting Officer may unilaterally implement such determination by requiring payment of the appropriate wage and fringe benefit scale, and the contractor agrees to comply with such implementation. The clause further requires a contractor warrant that the current contract prices do not include any allowance for contingent application of the Service Contract Act to this contract.

The Service Contract Act, which provides that the Secretary of Labor administer the Act, requires a Government contractor furnishing services to pay at least a minimum labor rate and fringe benefits determined by the Department of Labor (DOL) to be prevailing in the locality for the skills involved. The Act applies to all Government contracts over $2,500 and subcontracts thereunder, and is interpreted by DOL to apply to any contract which is principally for services without regard to whether the services are for support of commercial products or those products are serviced by the manufacturer in his own plant.

Application of the Act requires the contracting officer to obtain a wage determination from DOL for each type of service at each location where the work will be done and a copy of any collective bargaining agreement if there is an incumbent contractor. The wage determination tends to be an average wage or union scale for each class of employee. If the wage scale is different from that used in the current contract, the contract will have to be renegotiated to reflect the different wage scale.

The contractor will have to notify employees of the wage and fringe benefit determinations and report the wages for each class employee to the contracting officer.

The Act does not apply to "any work required to be done in accordance with the provisions of the Walsh-Healey Public Contracts Act." Although Walsh Healey is a General Provision of the three logistics support contracts involved in this study, the concern is that DOL may unilaterally declare the Service Contract Act applicable rather than Walsh-Healey. Contractors' concerns are that the prevailing wage will destroy their merit pay system with distribution of wages both above and below the prevailing average and tend to raise the overall salary structure. Where the contractor is servicing commercial aircraft for both the Government and commercial customers, the contractor may be forced to raise the overall salary structure in order to do a part of his business with the Government or, as an alternative, pay workers servicing aircraft for the Government a different wage than those servicing aircraft for commercial customers. The administrative impact on both the Air Force and the contractors involved for reporting, record keeping and contract negotiations between the Air Force and prime contractor, and between the prime and sub-contractors, would be significant.

Conclusion

There is a need for clarification of the intent of Congress of the Service Contract Act regarding applicability to a Government contract for services when like services are being provided in the same facility for both Government and industry

operations. With a mix of business, application of the act only to Government business may cause undue disruption to the contractor's salary structure.

4. Excess Profit

The Air Force contracts for the KC-10 and E-4, contain the mandatory clause of DAR 7-104.11(a) Excess Profits, which apply the provisions of Federal Statute 10 US 2382 (Vinson-Trammel Act). The contracts also contain the mandatory clause of DAR 7-103.13, Renegotiation, which provide in part that the profit limitations of the Vinson-Trammel Act would not apply to contracts or subcontracts subject to the Renegotiation Act. The requirements of the Vinson-Trammel Act were revived upon expiration of the reporting requirement of the Renegotiation Act on 30 September 1976 even though the Renegotiation Board continued to function until 31 March 1979.

The Vinson-Trammel Act provides that "the Secretary of a Military Department may not contract for the manufacture of all or part of any complete aircraft unless the contractor agrees, among other things, to (a) apply any excess profit, defined as so much of the profits greater than 12 percent of the total price of the contracts covered by the Act and completed in the taxable year, to the Treasury; (b) make no subcontract unless the subcontractor agrees to the conditions of the act; (c) permit audit and inspection of the books and manufacturing space by anyone designated by the Secretary of the Military Department, Secretary of the Treasury, or authorized committee of Congress; and (d) report

under oath to the Secretary upon completion of the contract the total contract price, cost of performance, net profit or loss and percentage of contract price that is profit or loss." The inclusion of these provisions in the contracts is further clouded by the Air Force acceptance of DD Form 633-7, "Claim for Exemption for Submission of Certified Cost or Pricing Data" for the basic airplane. The Air Force determined that the basic airplane procurement met the criteria of "adequate price competition" and "established catalog or market price of a commercial item sold in substantial quantities to the general public or industry."

The basic airplane for both the KC-10 and E-4 systems are produced on a common production line with the DC-10 and 747 aircraft with modifications being made on-line. The KC-10 and E-4 aircraft represent a small percent of the DC-10 and 747 production. Because neither Douglas or Boeing accumulate costs by individual airplanes, they requested a deviation to the standard DAR clause for progress payments. It was requested that progress payments be based on a percentage of estimated production costs. The DOD Finance Committee approved the deviation. However, the Vinson-Trammel Act requires that the percentage of profit be based on cummulative costs per aircraft.

The Vinson-Trammel Act also affects subcontractors and suppliers of both common and peculiar items, as the statute does not exempt standard commercial items when they are purchased for a

military aircraft requirement. The reluctance of subcontractors and suppliers to accept this clause, particularly the suppliers of standard commercial items, has a decided impact on the established subcontractor/supplier structure of both prime contractors.[54]

Conclusion

The Vinson-Trammel Act, with its required flowdown to subcontractors, has the effect of negating the role of competition in the commercial market as a determinant of fair and reasonable price for competitive fixed price contracts. Its inclusion in contracts for the acquisition of commercial aircraft needs to be reassessed in terms of the intent of the act.

5. Funding Restrictions

The basic (Greenline) options bid for the KC-10 contract were based on acquiring the most aircraft systems each year with the Air Force's planned funding profile for fiscal years 1978 through 1983. The basic options represented the most economical quantity that could be purchased within the cumulative funds planned. These options included the purchase of four aircraft systems in FY 1979, four in FY 1980, six in FY 1981 and six in FY 1982, for a total of 20 aircraft systems.[55] Any deviation from this schedule would automatically cause an increase in the fixed prices. In addition, aircraft to be bought after 1979 would be subject to adjustments for economic fluctuations.

Funding for the KC-10 had to be reduced from that planned for FY 1979 to stay within the overall Air Force budget, and only two

54. See Footnote 5
55. See Footnote 1

aircraft systems were ordered (a test aircraft and the first production aircraft). The Air Force now plans to purchase four aircraft in FY 1980, six in FY 1981 and eight in FY 1982. The 20 aircraft buy under the current program, having deviated from the most economical procurement schedule, is estimated to cost an additional $35.6 million.[56]

Conclusion

While the Air Force must base its overall budget on priorities, the reductions in the KC-10 program for FY 1979 precluded taking advantage of the economies of the marketplace. This problem could have been alleviated by a multi-year commitment to the program and relaxation of the full funding restriction. For instance the 20 aircraft systems could have been procured in accordance with the schedule of the basic options to the KC-10 contract if the funds available for FY 79 could have been used to make progress payments on the originally planned four aircraft systems rather than to fully fund only two aircraft systems. Also, the $35.6 million additional cost could have been avoided.

There are significant savings to be made in the acquisition of commercial aircraft, where the Government procures only part of the contractor's total production, by taking advantage of the existing market situation, economies of scale, optimum production rates, etc. The contractor could plan his material procurements, particularly the long lead items to take advantage of the market situation. While the dangers of long term commitments are understood, the savings to be made in a long-term commitment to a

56. Comptroller General Report PSAD-79-8, Issues Concerning Air Force KC-10A Advanced Tanker/Cargo Aircraft, 5 January 1979

low risk procurement (such as the KC-10 where commercial aircraft have already been produced, certified, and have accrued a large number of flight hours), far outweigh the advantages of insurance through a full funding restriction.

D. Logistics Support Analysis

The Air Force elected to contract for logistics support for those derivatives of commercial aircraft which were included in the study. There were advantages to be gained by using logistics support systems already established on a worldwide basis for commercial counterparts. To gain insight into the best business arrangement to take advantage of the commercially established support systems, the logistics support contract for the KC-10 was analyzed to identify the differences between Air Force requirements and those normally found in commercial practices. Also, the study would determine which, if any, requirements had a cost, schedule, and/or administrative impact on support contractors. Contracts for the support of the C-9 Aeromedical Evacuation Aircraft and the E-4 Advanced Airborne Command Post were than analyzed to determine if the results substantiated the findings of the KC-10 analysis and, if not, to identify the differences. The objective of the analyses was to compare alternative business arrangements for the support of commercially developed aircraft.

Discussion

Commercial airlines establish and maintain logistics support systems which are both organic and based on inter-airline agreements. Aircraft manufacturers provide initial spares and make replacement parts available to commercial customers but rarely perform supply and maintenance functions for them.[57] For this reason, it is difficult to make a direct comparison of the

57. Interview with Douglas Aircraft Company (See Footnote 5)

Air Force logistics support contracts with commercial practices. As a result of the analyses, however, several observations relating to the business arrangements established by the Air Force for commercial logistics support warrant further discussions and are included in this section.

A major set of problems, discussed in Section A above, was caused by including in support contracts the mandatory general provisions for all Government contracts over $10,000. The application of these provisions with their flowdown requirements to the acquisition of replacement parts from off-the-shelf or from regular production, or to subcontractor services, creates the same problems for support contractors. Tailoring a special set of general provisions for the acquisition of commercially developed aircraft and for commercial logistics support, as recommended in Section A, will relieve the contractor and DOD from most of these problems.

Facts and Observations

1. Spares and Replacement Parts. Aircraft manufacturers normally make recommendations for provisioning of spare parts and sell initial stocks to commercial customers. Standard parts sales agreements are used to cover the availability and sales of replacement parts to their customers. Under the Parts Sales Agreement for the DC-10, for example, Douglas agrees to make available, and deliver with reasonable promptness, new replacement parts and equipment manufactured by Douglas or to Douglas'

specifications as long as at least 10 DC-10 aircraft are being operated in commercial service.[58] The customer agrees to buy those replacement parts and equipment from Douglas, at established prices, except in cases of emergency or where the seller provides defective parts. Also, major high-cost, long-leadtime parts (insurance items) not subject to normal attrition are made available to commercial customers through a lease agreement. These proprietary spare parts many be leased from the manufacturer's warehouses located in the U.S. and abroad.[59]

Under the support contracts for the C-9, E-4 and KC-10 aircraft, manufacturers made provisioning recommendations for initial spares and determined the range and quantity of spares to be positioned at each Contractor Operated and Maintained Base Supply (COMBS). The business arrangements for the initial provisioning of spares, however, differed between each of the Air Force contracts studied and between those contractual arrangements and commercial practices. The major difference concerns payment for, and title to initial spares. Replacement parts are provided for by the contractor under all three Air Force support contracts based on a fixed cost per flying hour. The different business arrangements for the Air Force contracts pertaining to initial spares are as follows:

58. Douglas Aircraft Company, Parts Sales General Terms Agreement
59. Douglas Aircraft Company, Terms and Conditions Lease Agreement of Douglas DC-10 Spare Parts from Stores at Locations to be Specified by Douglas

C-9. Douglas made available the initial spares without Air Force funding and retained title to those spares located in the COMBS.[60] Title to a replacement part was shifted to the Air Force when the part was withdrawn from the COMBS and the contractor accepted title for those parts turned in to the COMBS. An element of spares depreciation was included in the cost per flying hour to amortize the initial spares. This arrangment was advantageous to the Air Force in that it did not require initial Air Force funding for spares and avoided problems associated with spare accountability and traceability when there is a mix of parts between Government owned and commercially owned C-9 aircraft.

The same business arrangement for initial spares was made by the U.S. Navy in its early C-9 program.[61] The arrangement was satisfactory for the Air Force, Navy and the contractor. However, the Navy subsequently purchased a C-9 aircraft and support on a sole source basis and in reviewing the required cost and pricing data, the Defense Contract Audit Agency (DCAA) disallowed an interest element of the spares depreciation cost. Douglas would not undertake the provisioning without being reimbursed for the interest on capital investment in the spares. As a result, the Navy paid for the spares and acquired title.[62] Arrangements were also made whereby the Navy paid Douglas for the provisioned spares for all of its C-9 aircraft and adjusted the fixed cost per flying hour.

60. C-9 Logistics Support Contract F41608-68-C-0001, AFLC, 10 August 1967
61. See Footnote 57
62. See Footnote 57

In view of the DCAA ruling, the Air Force revised its C-9 support contract by agreeing to a revised depreciation method for spares (sum of digits rather than straight line) which excluded the interest element but depreciated spares at a faster rate.[63] This arrangement did not relieve Douglas of the relatively large investment in initial spares for which there was no return on the investment.

E-4. Boeing furnished the initial provisioning of spares for the E-4A aircraft and retained title. The Air Force agreed to pay Boeing interest on their investment.[64] The contract further stated that "if the Government elects to discontinue E-4 support by this contractor for any reason, the Government agrees to purchase all spares or an interchangeable equivalent." To minimize the conversion liability in case the Government elects to discontinue support with this contractor, incremental payments for the spares inventory were authorized in such amounts and at such times as determined solely by the Government. Title to an undivided interest in the inventory equal in value to the incremental payment was invested in the Government and interest payments were accordingly reduced. Payment of interest as a line item of the contract was not included in the support contract for FY 78 and subsequent years which added support for the E-4B aircraft.[65] Arrangement for incremental payments for the additional spares in the inventory were, however, continued. Although payment for the initial spares inventory was made by the

63. See Footnote 57
64. E-4 Logistics Support Co ract F34601-73-C-2856, AFLC, 8 June 1973
65. E-4 Logistics Support Contract F34601-78-C-2934, AFLC, 10 October 1978

Air Force, there are potential problems of accountability when the Air Force assumes title to parts that lose their identity as Air Force property during replacement and repair.

KC-10. The C-9 and E-4 problems in reimbursing logistics support contractors for capital investments in required stocks of spares led to the contract terms for the KC-10. Under this contract, Douglas recommends the range and quantity of initial spares and, with the initial provisioning approved, will make the spares inventory available. The Air Force will pay for the spares at a negotiated firm fixed price with payment made on evidence of delivery by the contractor.[66] Title will be vested in the Government although possession and control of the spares will be retained by the contractor. This arrangment resolves the problem of paying interest on the initial spares investment but does not void potential problems associated with Government title to property. These potential problems relate to property accountability and to applicability of the Service Contract Act.

Conclusion

The question of who holds title has a significant impact on accountability of spare parts. Problems of accountability are compounded when Government owned parts are commingled with commercially owned parts for depot repair and overhaul. Also, assumption of title to spares by the Government raises the issue of potential applicability of the Service Contract Act to operation of the COMBS and overhaul of replaced parts and components. It is concluded that contracting directives should

66. KC-10 Logistics Support Contract F33700-78-C-0003, AFLC, 3 January 1978

provide for payment of investment costs of contractors, when provisioning is to be managed and controlled by contract, to enable title to remain with the contractor. These costs are not identified, or precluded, under competitive fixed price contracts since a breakdown of cost elements is not required when adequate competition exists. Prohibiting these essential costs in non-competitive contracts leads to establishment of complex supply arrangements that may not be in the best interest of the Government.

Recommendation

It is recommended that DAR Section XV provide for the allowance of capital investment costs where the contractor is required by contract to furnish and maintain an inventory of spare parts for the benefit of the Government.

2. Maintenance

Aircraft manufacturers do not normally provide maintenance service for commercial customers. Airlines establish their own organization, intermediate, and depot level maintenance capability which is analogous to the Air Force support system for military aircraft. The logistics support contracts for the C-9, E-4, and KC-10 aircraft systems and associated aerospace ground equipment, however, contain maintenance concepts which includes both Air Force and contractor maintenance. In each case, maintenance to be performed by the Air Force includes.

-- Preflight and postflight inspections.

-- Removal and replacement of line replaceable units including engine changes.

-- Systems operational checkout and troubleshooting.

-- Minor inspections.

Intermediate and depot maintenance is conducted by the contractor but differ in contract treatment for the three systems studied.

C-9. Line items in the contract clearly identify certain depot inspection and maintenance functions to be performed by the contractor and establishes a fixed price for each performance of the function. Depot level maintenance, other than that identified in contract line items, is covered by a line item for "over and above" work with fixed prices to be negotiated with each task order.

E-4. All depot level maintenance for the E-4 system is contractually covered by a line item for "over and above" work when directed by the Administrative Contracting Officer. This line item identified unschedule Depot Level Maintenance, Support Equipment Heavy Maintenance and Engine Heavy Maintenance as "over and above" work with prices to be negotiated when the task is ordered. There is no reference to scheduled depot maintenance although the special provision for "over and above" work addresses the establishment of fixed prices for repetitive depot maintenance tasks.

KC-10. A line item for maintenance and replenishment materiel necessary to support the KC-10 is included in the logistics support contract. The contractor is required to perform intermediate and depot level maintenance tasks which are identified in the Statement of Work. Payment for the contractor maintenance tasks is included in the fixed price per flying hour per aircraft.

Conclusion

Intermediate and depot maintenance functions for the logistics support contracts analyzed are contractually covered under different business arrangements. They are (1) fixed price for the performance of each functions (C-9), (2) negotiated price for each tasks as "over and above" work (E-4), and (3) cost of depot maintenance included in fixed price per flying hour (KC-10). Further comparison of actual maintenance costs and analysis of problems associated with each arrangement was not made to determine if there is a "best" business arrangement for acquiring contract maintenance support for commercially developed aircraft.

CHAPTER IV - SUPPORT EQUIPMENT - MOBILE ELECTRIC POWER

A commercial off-the-shelf diesel engine driven generator was acquired by the Air force to meet some of the mobile electric power requirements previously met by generators developed to military specifications. The commercial generator acquired provides improved performance at considerable savings in overall costs over the military specification generator. The commercial generator acquisition is discussed in this chapter to demonstrate the advantages of "buy commercial" and to lend insight to the development of procedures for acquiring commercial products.

Discussion

Mobile electric power (MEP) is a major ground support requirement for starting aircraft engines and for operating on-board equipment for purposes of maintenance and other ground operations. The Department of Defense (DOD) centrally manages the requirement for MEP through a single program manager (PM). Military specifications have been developed for a standard family of generators established by the PM. Each DOD agency acquires MEP using the mandatory military specifications. An Air Force program manager for MEP acquisitions is located at Sacramento Air Logistics Center (ALC) and an Air Force Monitor for the Maintenance Posture Improvement Program (MPIP) is located at Warner Robins Air Logistics Center.

User Needs

In September 1971, a member of the Military Airlift Command (MAX) submitted a suggestion that off-the-shelf diesel power MEP

generators being used by commercial airlines be acquired to replace MEP generators acquired to military specifications. The suggestion contended that use of commercial generators would result in savings in initial cost, ease of maintenance and lower fuel consumption. It was suggested that a service test of commercial MEP generators be conducted to compare them with the Air Force standard A/M 32-60(A) gasoline turbine powered MEP generator used in support of C-5 and C-141 aircraft. Because the A/M 32-60(A) had recently been acquired as the Air Force standard and was still being introduced to Air Force bases as a replacement for older MD-3 MEP generators, no action on the suggestion was taken at that time.

By 1974, conditions with respect to fuel cost and availability had changed dramatically. MAC resubmitted the suggestion that a service be made of commercial off-the-shelf MEP generators. Although the requirements for electrical power was the same as that for the Air Force standard MEP generator, the commercial generators as opposed to the standard generator. The cost of acquisition and maintenance was also a strong consideration.

Market Research and Analysis

To conduct service testing of MEP generators other than the standard family of generators, approval of the DOD-PM was required. The Air Force generator PM as Sacramento ALC and the

monitor for the Air Force Maintenance Posture Improvement Program (MPIP) supported the need for service testing commercial MEP generators. In September 1974, agreement was reached for conducting the service testing under the MPIP.

Market research revealed that there were only two commercial MEP generators in the size required for use by airlines. These were both diesel engine driven generators manufactured by Hobart Brothers of Troy, Ohio (Model 90G20P) and by Steward and Stevenson of Houston, Texas (Model 4900D). However, other diesel engine driven generators which could meet the power requirements of the C-5 and C-141 aircraft were part of the family of standard generators and in use by the Army and Navy. Therefore, the project test directive, issued in April 1975, included a comparison of fuel consumption and functional performance of the two commercial generators with the military standard items mentioned above.

Testing was conducted by MAC personnel at Travis Air Force Base, California. The military standard items to be compared were the A/M 32-60(A) in use by the Air Force, the MEP-115A in use by the Army and NC-10C in use by the Navy. Two standard sets of each type were provided by the Army and Navy for the test and three commercial MEP generators were bailed from each of the two manufacturers of the commercial generators.

Service testing, as a part of the market research and analysis to determine product suitability, produced the following results:

MEP Generator Service Test Results

Characteristics	Military Standard MEP Generators A/M 32-60(A)	MEP-115A	MC-10C	Commercial MEP Generators 4900D	90G20P
Unit Cost Estimated	$56,000*	$17,500	$30,000	$18,500**	$14,970**
Weight (Lbs.)	2,800	5,000	7,000	6,000	5,900
Fuel Consumption (Gal/Hr.)	33	3.06	3.3	2.57	2.28
Fuel Cost (Unit year)***	$38,785	$ 2,257	$ 2,865	$ 2,233	$ 1,932
Run Time/Full Tank (Hrs.)	5.5	16.3	9.09	19.45	21.05
Mean Time Between Failure (Hrs.)	Unknown	45	86	213	270

*Includes compressed air capability.
**Prices for acquisition were proposed at $15,935 and $14,800 respectively.
***Based on 7 hours operation per day at $.46 per gallon for gasoline and $.34 per gallon for diesel fuel.

The evaluation report of 10 September 1976 clearly demonstrated that the acquisition of commercial diesel engine driven MEP generators to replace the Air Force standard MEP generator (A/M 32-60(A) would be the most cost effective means of meeting MAC requirements. While the report cited the results of parts support for the service testing, no evaluation of parts support systems was made to compare commercial systems with the DOD supply system. The report did point out that problems were encountered in obtaining repair parts for the military standard generators through the DOD supply system whereas the few repair parts needed for commercial generators were obtained from area distributors within 24 hours. Following is an excerpt from the test report summarizing the suitability of the test items for Air Force use:

EXCERPT FROM MEP Project GM 76-1E Report, Headquarters 60th Military Airlift Wing (MAC), Travis Air Force Base, California

"o. Suitability to Satisfy C-5/C-141 Aircraft Support Requirements:

(1) All four types of diesel engine driven generator sets were capable of supporting C-5/C-141 aircraft electrical requirements. All are superior to the A/M32A-60 generator sets in stability of both frequency and voltage under changing load conditions.

(2) Because of maintenance deficiencies and supply problems encountered with the DOD MEP 115A and the NC-10C, as documented throughout this report, these units are not considered suitable from the maintenance standpoint. Both of these units are difficult to maintain, subject to frequent failures, and have little available inventory of spare parts. The NC-10 epitomizes the fallacy of the present procurement system of "low bid contractors". The construction, placement of components, quality of instruments and switches, faulty wiring, lack of accessability, small fuel tank size, and arrangement of the engine, and excessive maintenance requirements are all problems associated with inferior materials, and present quality control procedures. It would be far less expensive, overall, to procure quality equipment at a greater cost and to insure that we have reliable equipment that will be in the Air Force inventory to support our new aircraft in future years.

(3) The Stewart & Stevenson Model 4900D is an excellent generator, and could be very much better with some of the improvemements that we have recommended. It is considered as a very suitable replacement for present in-use generator sets, and is ranked number two in the order of preference.

(4) The diesel generator set ranked number one, in order of preference is the Hobart Model 90G20P. This is the highest rated generator set in all respects. This opinion is shared by all who came in contact with it: operators, users, and maintainers. The quality built into this unit is apparent throughout, from the trailer on up, and from end to end. It is the easiest to operate, provides excellent accessability for servicing and maintenance, has the greatest fuel economy, is quieter and had fewer malfunctions and breakdowns. (The three Hobart units were virtually trouble-free during the test period which totaled 2304 operating hours). The factory manual furnished by Hobart should be adopted into the Air Force technical order system as is, with no changes whatsoever. Their manual, coupled with the optional test box, P/N 488318-2 makes electrical troubleshooting quick,

easy and accurate. If the recommendations of this report are accepted, the test box should be inluded in the AGE shop section of applicable weapons systems T.A.s, quantity one per AGE Shop. This is also the least expensive unit of the four tested, costing only about a fifth as much as A/M32-60's, several thousand dollars less than the Stewart & Stevenson and MEP 115A, and less than half as much as the NC-10C."

Acquisition Strategy

Based on the results of the service testing, the Air Force requested permission to acquire a commercial diesel engine driven MEP generator to replace the gasoline turbine driven MEP generator. A waiver was requested from the DOD Project Manager (PM-MEP). The initial procurement was planned for 136 generator sets.

An acquisition strategy was developed for a competitive procurement based on a functional specification, restricted to manufacturers of MEP generators for commercial airlines. A purchase description was prepared which encompassed the functional performance of the two known commercial MEP generators as they are manufactured for the airlines. No specials requirements were imposed other than compliance with Government specifications for the coolant corrosion inhibitor, diesel fuel, lubricating oil, electromagnetic interference and external power cables. Also, for first article testing, MIL-STD-705B requirements were imposed for methods of testing.

A PM-MEP waiver was at first refused but eventually obtained with the provision that the solicitation contain a notice of possible DOD standardization on the model selected. There were objections to Air Force-wide standardization on the model

application to only one command. Further, it was believed that the standardization notice would cause delays in procurement because of interest generated by a potentially large procurement. However, at PM-MEP insistence, the standardization notice was included in the intial procurement of 136 generator sets.

The Small Business Administration requested the procurement be set aside for small business using the military specification for DOD standard items rather than the commercial purchase by the Air Force because such a set-aside would negate the advantages of acquiring a commercial, off-the-shelf MEP generator.

A mix of contractor and Government supply support was planned since the commercial generators would use certain engine parts already cataloged and currently held in the DOD wholesale supply system. Such parts would continue to be centrally supported. Spare parts unique to the commercial generators would not be introduced into the DOD wholesale supply system but would be obtained through local purchase in the commercial market under a method of local purchase used by the Air Force known as the Contractor Operated Parts Store (COPARS). Under the COPARS concept, a contract is awarded for operation of an on-base store which stocks specified items normally obtained through local purchase for maintenance of commercial vehicles. This method allows for simplified accounting, elimination of stock levels and more timely delivery of parts directly to the repairman. Savings

are anticipated by the omission of cataloguing for approximately 200 items ($8400) and from holding those items in the wholesale system for the twenty year life cycle of the generators ($416,000).

Repair and maintenance would be the responsibility of the user. In the event of a major overhaul requirement, above and beyond the user repair capability, the user agency may elect to contract for repair and overhaul. Commercial operating and maintenance handbooks would be obtained and used. It was planned that all operational maintenance training be conducted by the Air Force. Approximately two hours of operator training and one week of maintenance training was anticipated. The training was to be developed by the Air Training Command based on the commercial manuals supplied with the equipment.

Contract Approach

The negotiation method of solicitation was used by authority of DAR 3-210.2 (xiii), Supplies or Services for which it is impracticable to obtain competition by formal advertising.

The solicitation was restricted to firms currently producing generators for commercial airlines, of the type and size specified. The diesel engine driven generator acquisition was selected for the DOD pilot program under the Commercial Commodity Acquisition Program (CCAP). The restricted solicitation was approved by the DOD manager of the CCAP as being in compliance with Federal procurement policy as cited in DODD 5000.37 with respect to commercial market acceptability. Two competitive

offers were received and award was proposed to be made to Hobart Brothers, the lowest offeror in the amount of $14,800 per unit. Award was delayed by protest from a firm that did not currently manufacture MEP sets for the airlines. The protest was denied by the General Accounting Office on the basis that the need was comparable to that of the airlines and that adequate competition was obtained.[1]

Facts, Observations and Conclusions

The following facts, observations and conclusions were developed through analysis of reports, correspondence and memoranda of meetings and through interviews with the contracting officer and other materiel management personnel of the Sacramento Air Logisitics Center as well as with the contractor, Hobart Brothers, at Troy, Ohio.

1. The market research and analysis was instrumental in the development of a sound acquisition strategy and contracting approach. Service testing as a function of market research and analysis was essential to determine the suitability of commercial generators to meet Air Force needs. The results of the service testing, comparing cost and performance of commercial generators with military standard generators, convinced the PM-MEP and manager of the DOD CCAP pilot program of the cost effectiveness of buying commercial generators.

11. Comptroller General Decision, File B-191116, Essex Electro Engineers, Inc.. October 2, 1978

2. Restricting solicitations to manufacturers making products with proven market acceptability is appropriate and can be supported to the satisfaction of the General Accounting Office.

3. Purchase descriptions for solicitation in the acquisition of commercial products can be performance oriented if they are based on realities of the market place. The winning contractor indicated in an interview that the references to Federal and military standards and specifications for lubricants, testing and other requirements appeared to be formidable but were found to be equal to, or less than their own product specifications. Several days of review, however, were required to determine that the purchase description was, in fact, in conformance with their commercial product.

4. With the inclusion of general provisions, the solicitation package was more onerous than a commercial solicitation. Officials of Hobart Brothers stated that, in view of the apparent complexity of the solicitation package, a team of management, marketing, finance, accounting and legal personnel had to review the package to assure understanding of the terms, conditions and requirements of the solicitation. They concluded that compliance with the solicitation would have no major impact on their operation. Even though Hobart personnel had some familiarity with Government forms and provisions through small quantity sales to military bases, FAA, the Coast Guard, Agency for International Development, and for foreign military sales, it took eight mandays to review the solicitation compared to one manday to

review a comparable commercial solicitation. They inferred that a company not familiar with Government forms and provisions would have difficulty understanding the solicitation. The contracting officer subsequently advised that the method of incorporating general provisions in this solicitation has since been discontinued in favor of a more easily understood method.

5. The need for operator training was satisfied by the contractor's regular after-sales customer service. Area distribution managers are advised of shipments to customers who in turn alert the area representatives of the engine manufacturer. Representatives of both visit customers when the units arrive to check out the units and provide operator training. Also commercial manuals satisfy the need for technical manuals. Operators of the commercial generators during the service testing, for example, asserted that the commercial manuals were much better than the technical manuals for the military standard generators and could be used without modification (see excerpt of test report included in section on Market Research and Analysis).

6. Spare parts unique to the commercial generators were to be acquired through local purchase for the initial quantity of 136 generator sets. However, the materiel manager at Sacramento ALC indicated that the COPARS system at user installations was not generally satisfactory and that actions were being taken to catalog and provide all repair parts for the commercial generators through the DOD supply system. Since it was proved during service testing that prompt parts support is available through the

supplier distribution system (versus COPARS), it does not appear that all alternatives were explored prior to making the decision to use the DOD supply system.

7. A purchase of an additional 430 generator sets from Hobart Brothers is being made in order to standardize on this generator. The generator sets will be deployed throughout the Air Force. The purchase includes a separate line item for data, other than Hobart Brothers proprietary data, which will allow for competition in any follow-on procurement. Competition would enable manufacture (primarily assembly) by small businesses of identical generator sets although it is acknowledged by the contracting officer and the materiel manager that manufacture by a different firm would be more costly than manufacture by Hobart Brothers.

Recommendations

It is recommended that the following actions be taken by the Director of Contracting and Acquisition Policy, DCS/RD&A in conjunction with the Directorate of Logistics Plans and Programs, DCS/L&E, Headquarters USAF in developing Air Force policy and procedures for implementing DOD Directive 5000.37, Acquisition and Distribution of Commercial Products (ADCP), September 29, 1978.

1. Establish guidelines for conducting "market research and analysis" for major items of equipment that will determine availability of commercial systems for spare part support as well as the suitability of commercial products for meeting user needs.

A "market research and analysis" should be conducted prior to, and provide the basis for, the development of an acquisition strategy which recognizes the realities of the marketplace.

2. Simplify solicitation packages by tailoring a set of general provisions for commercial products (see Chapter III, Paragraph 1, Recommendations).

3. Limit references to military specifications in purchase descriptions for commercial products to those that apply only to unique requirements which are not satisfied by the existing product.

CHAPTER V - SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations derived from the study of Air Force acquisition of commercial derivative aircraft, contract logistics support for those aircraft, and the acquisition of a major item of ground support equipment are summarized by major areas of interest.

1. Mandatory General Provisions

One of the biggest drawbacks to the Government acquisition of commercial aircraft, aircraft modifications, and contract support is the practice of including a large number of general provisions in the solicitations and subsequent contracts. The general provisions are superimposed on product-related objectives and create additional administrative burden on contractors, increasing their cost to produce. They are meaningless when applied to acquisition of aircraft, components, spare parts, etc. which have already been produced for commercial counterparts (off-the-shelf) or to acquisition from regular production of which the Government purchases only a portion. Where they are required to be included in subcontracts for commercially produced items, flowdown is exceptionally difficult because of questionable applicability. Recognizing that many general provisions are required by law or Executive Order, it is recommended that:

- DOD develop and obtain approval to include in DAR Section VII a special set of general provisions tailored to the acquisition of commercial systems and products and contract support for those systems and products.

- Federal Acquisition Regulation Project Office (FARPO) include in FAR Part II, Acquisition and Distribution of Commercial Products, a definition of "subcontract" which clarifies the application of contract requirements to subcontracts for parts purchased for stock or regular production.

2. Military Requirements of the Statement of Work

The Air Force practice in acquiring commercially developed aircraft and aircraft modifications is to apply FAA and established commercial standards to the basic airplane and military specifications and standards to the modifications. Documentation requirements, however, generally apply to the acquisition of the total system. The application of military requirements precludes the Government from obtaining aircraft at the most economical cost which could be accomplished by taking advantage of established commercial practices relative to commercially developed and proven aircraft. It is therefore recommended that:

- Implementing directives for FAR Part 11 include guidelines for acquiring commercial-type products, where the cost of modifications represent less than 35 percent of the commercial aircraft price, using commercial practices and standards. If the cost of modifications exceed 35 percent of the price of the basic product, modifications should be segregated and contracted for separately.

- Air Force eliminate the requirement, and cost, for documenting company management practices in accordance with military data item descriptions for the acquisition of commercial systems.
- For the case of acquisition of commercially developed aircraft with minor modifications, the manufacturer be allowed to retain control of the configuration up to the point of final configuration of the first article.
- Air Force simplify procedures for processing requirements for, and evaluation of, support equipment.
- Where computer programs are to be hardwired into the computer after test and evaluation, only that documentation necessary for assuring proper operation of the equipment be required.
- Air Force eliminate the requirement for a Contract Work Breakdown Structure for the acquisition of commercial aircraft where production of aircraft for the Government is commingled with production of commercial counterparts.

3. Corollary Conclusions

The following corollary conclusions of the researchers are based on issues which affect the Government's ability to take advantage of established commercial practices.

- In view of the inclusion of a "Special Rights" provision in several Air Force contracts for commercial aircraft and logistics support, the need for special rights should be assessed and if found to be needed, those rights should be formalized in the DAR Part 9 and in the clause in DAR 7-104.9.

- Tailoring a set of general provisions for the solicitation and acquisition of commercial products will eliminate many requests for waivers and deviations.
- Applicability of the Service Contract Act to a Government contract for services when like services are being provided in the same facility for both Government and commercial operations needs to be reassessed.
- Imposing the Excess Profit Clause (Vinson-Trammel Act), with its required flowdown to subcontractors, in contracts for commercial products has the affect of negating the role of competition in the commercial market as a determinant of fair and reasonable price for competitive fixed price contracts.
- Procurement of commercial derivative aircraft clearly provides advantages to the Government. Those advantages can be eroded by the DOD full funding restriction rather than commitment to full program requirements.

4. Contract Logistics Support

Logistics support of a small number of commercial derivative aircraft can best be accomplished under contract to take advantage of existing support systems, established on a world-wide basis, for commercial counterparts. Several issues concerning contract logistics support for commercial derivative aircraft leads to the following recommendations:

- When the contractor is responsible for managing and controlling the provisioning of spare parts, the contractor

should make spares available and receive payment for investment costs. This would enable title to the spares to remain with the contractor and avoid problems of accountability when Government parts are commingled with commercial parts for depot repair. Provisions for payment of capital investment costs for contractor owned spares provided for Government use should be included in DAR Section XV .

- o Further analysis of problems associated with different business arrangements in contracting for depot maintenance should be conducted toward developing guidelines for future contracts for logistics support.

5. Ground Support Equipment - Mobile Electric Power

The acquisition of commercially developed Diesel Engine Driven Generator sets to replace generator sets developed to military specifications exemplifies the advantages of the "Buy Commercial" policy. The commercial generator acquired provides improved performance at considerable savings in overall cost. The results of the analysis of the acquisition contract, however, substantiated some of the major findings of the study of acquisition of commercial derivative aircraft. The following recommendations are based on the results of the analysis of the commercial generator acquisition:

- Simplify solicitation packages by using a tailored set of general provisions for the acquisition of commercial products and commercial support (see recommendation on Mandatory General Provisions.)
- Limit references to military specifications in purchase descriptions for commercial products (see recommendation on use of military specifications and standards, Military Requirements of the Statement of Work).
- In view of the excellent results of the market research and analysis, including service testing, for the acquisition of the commercial generator, DOD should develop guidelines for the conduct of market research and analysis for commercial products to be used in establishing an acquisition strategy which recognizes the realities of the marketplace.

APPENDIX

GENERAL PROVISIONS/CLAUSES

Cited in Contracts for: Aircraft Acquisition - E-4, KC-10
Logistics Support - E-4, C-9, KC-10

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-103 1	Definitions	X	X	X	X	X
7-103.2	Changes	X	X	X	X	X
7-103.3	Extras	X	X	X	X	X
7-103.4(a)	Variation in Quantity	X		X	X	X
7-103.5(a)	Inspection	X	X	X	X	X
7-103.6	Title and Risk of Loss	X	X	X	X	X
7-103.7	Payments	X	X	X	X	X
7-103.8	Assignment of Claims	X	X	X	X	X
7-103.9	Additional Bond Security	X		X	X	X
7-103.10(a)	Federal State and Local Taxes	X		X		X
7-103.10(b)	Federal State and Local Taxes		X		X	
7-103.11	Default	X	X	X	X	X
7-103.12(a)	Disputes	X	X	X	X	X
7-103.13(a)	Renegotiation	X	X	X	X	X
7-103.14	Discounts	X	X	X	X	X
7-103.15	Rhodesia and Communist Areas	X		X		
7-103.16	Contract Work Hours and Safety Standards Act-Overtime Compensation	X	X	X		X
7-103.17	Walsh-Healey Public Contracts Act	X	X	X	X	X
7-103.18(a)	Equal Opportunity Clause	X	X	X	X	X
7-103.19	Officials Not To Benefit	X	X	X	X	X
7-103.20	Covenant Against Contingent Fees	X	X	X	X	X
7-103.21(b)	Term for Convenience of Government	X	X	X	X	X
7-103.22	Authorization and Consent	X	X	X	X	X
7-103.23	Notice and Assistance Regarding Patent and Copyright Infringement	X	X	X	X	X
7-103.24	Responsibility for Inspection	X	X	X	X	X
7-103.25	GBL - FOB Origin Ship	X		X	X	X
7-103.26	Pricing of Adjustments	X	X	X	X	X
7-103.27	List of Exmpl. Open. for Vets		X		X	X

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.3	Buy American Act	X	X	X	X	X
7-104.4	Notice to Government Labor Disputes	X	X	X	X	X
7-104.6	Filing of Patent Applications	X			X	X
7-104.7	Contract Schedule Subline Not Separately Priced	X				
7-104.9(a)	Rights in Tech Data and Computer Software	X	X	X	X	X
7-104.9(b)	Rights in Tech Data and Computer Software	X	X		X	
7-104.9(h)	Technical Data - Withholding Payment	X	X	X	X	X
7-104.9(l)	Ident. of Technical Data	X	X	X	X	X
7-104.9(n)	Data equirements	X	X	X	X	X
7-104.9(o)	Warranty of Technical Data			X	X	
7-104.12	Military Security Requirements	X		X	X	X
7-104.13	Preference for Certain Domestic Commodities	X				
7-104.14(a)	Utilization of Small Business Concerns	X	X	X	X	X
7-104.14(b)	Small Business Subcontractor Program	X	X	X	X	X
7-104.15	Examination of Records by Comptroller General	X	X	X	X	X
7-104.16	Gratuities	X	X	X	X	X
7-104.17	Convict Labor	X		X	X	X
7-104.18	Priorities, Allocations and Allotments	X	X	X	X	X
7-104.20(a)	Utilization of Labor Surplus Area Concerns	X	X	X	X	X
7-104.20(b)	Labor Surplus Subcontractor Program	X	X	X	X	X
7-104.21	Limitation on Withholding of Payments	X	X	X	X	X
7-104.22	Equal Opportunity Pre-Award Clearance	X	X	X	X	X
7-104.23	Subcontracts	X	X	X	X	X
7-104.24(a)	Government Property	X	X	X	X	X
7-104.24(c)	Government Property Alt. Par G	X			X	

DAR Reference	Title	E-4 Log	C-? Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.28	Quality Program	X			X	
7-104.29(a)	Price Reduction for Defective Cost or Pricing Data	X	X	X	X	X
7-104.29(b)	Price Reduction - Price Adj.				X	
7-104.32	Duty Free Entry of Listed Canadian Supplies	X	X	X	X	X
7-104.33	Inspection System	X				
7-104.36(a)	Utilization of Minority Business	X	X	X	X	X
7-104.36(b)	Minority Business - Sub-contractor Program	X	X	X	X	X
7-104.38	Require Source for Minature and Instrument Ball Bearings	X	X	X	X	X
7-104.39	Interest	X	X	X	X	X
7-104.40	Competition in Sub-contracting	X	X	X	X	X
7-104.41(a)	Audit by DOD	X	X	X	X	X
7-104.42(a)	Subcontractor Cost or Pricing Data	X	X	X	X	X
7-104.44(a)	Value Engineering Incentive			X	X	X
7-104.45(a)	Limitation of Liability		X	X		
7-104.48	New Material	X	X	X	X	X
7-104.59	Required Source - Aluminum Ingots				X	
7-104.61	Frequency Authorization	X	X		X	X
7-104.62	Material Inspection and Receiving Report	X	X	X	X	X
7-104.68	Marking of Shipments				X	
7-104.69	FOB Point of Delivery of GFP	X	X	X	X	X
7-104.70	FOB Origin		X		X	X
7-104.71	FOB - Destination	X	X	X		
7-104.72	FOB Origin-Minimum Size of Shipments				X	X
7-104.73	Loading, Bracing and Blocking of Freight Car Shipments	X			X	X
7-104.74	Shipments to Ports - Clearance and Documentation Requirements	X	X			
7-104.75	Diversion of Shipment Under FOB Destination Contracts	X		X		X
7-104.76	FOB Destination - Evidence of Shipment	X		X		

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.77(f)	Government Delay of Work	X	X	X	X	X
7-104.79(a)	Safety Precautions for Ammunition and Explosives	X	X	X		X
7-104.80	Notice of Radioactive Materials	X	X	X		
7-104.82	Payment of Interest on Contractors' Claims	X	X	X	X	X
7-104.83(a)	Cost Accounting Standards	X	X	X	X	X
7-105.2	Approval of Contract	X	X	X	X	X
7-105.4	Report of Shipment		X		X	X
AF ASPR Sup 1-320(c)	Notif. of Govt. Security Activity	X		X		X
AF ASPR Sup 7-104.70	FOB Orig. GBL - Mail Indicia			X		X
AF ASPR Sup 7-104.103	Safety and Accident Prevention	X	X	X		X
AF ASPR Sup 7-104.100	Restriction on Printing	X	X	X	X	X
AF ASPR Sup 7-7505.3	Limit. on Govt. Obligation	X	X	X		
AF ASPR Sup 9-203.51	Rights in Data	X	X			
7-104.35	Progress Payments	X		X	X	X
7-1902.2	Changes	X		X		
7-1902.4	Inspection of Services	X		X		
AF ASPR Sup 7-7503.1	Definitions	X	X	X		
AF ASPR Sup 7-7503.4	Payments	X				
7-1902.11	Discounts	X		X		
AF ASPR Sup 7-7503.6	Termination for Convenience	X		X		
7-104.81	Accident Report and Investigation	X	X	X	X	X

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.65	Insurance	X	X	X		
7-104.10	Ground and Flight Risk	X	X	X	X	X
7-104.11	Excess Profit					X
AF ASPR Sup 7-104.156	Min. Wind Velocity Specs	X	X			
AF ASPR Sup 7-7503.5	Discounts	X		X		
6-305(c)	Pref. For Domestic Spec Metals	X	X	X	X	X
1-2207.2	Req. Source for Jewel Bearings	X	X	X	X	X
7-104.9(p)	Restrictive Mark on Technical Data	X	X	X		X
7-104.45(b)	Limitation of Liability	X			X	X
AF ASPR Sup 7-5000.3	Limitation on Use, Dup. Discl. Technical Data	X				
7-104.83(b)	Admin of Cost Accounting Standards	X		X		X
7-2003.41	Order of Precedence		X	X		
7-104.63	Protection of Government Buildings, Equipment and Vegetation	X	X	X		X
7-104.91	Contracts Conditioned on Availability of Funds	X				
7-103.29	Clean Air and Water	X	X	X		X
7-103.28	Affirmative Action for Handicapped Workers	X	X	X		X
AFLC ASPR Sup 7-7504.2(a)	Inspection of Services	X		X		
7-602.26	Small Business Sub-contract Program	X				
7-104.95	Preference of US Flag Air Carriers	X	X	X		
7-104.9(m)	Deferred Ordering or Tech Data and Computer Software	X	X		X	X

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.78	Geographic Distribution of Defense Subcontract Dollars	X	X			
AFLC ASPR Sup 7-7504.2(b)	Inspection	X		X		
7-104.49	Government Surplus		X	X		X
9-103.1(a)	Patent Indemnity			X		X
7-103.10(d)	Taxes, Duties and Charges for Doing Business		X	X		
7-104.8(b)	Refund of Royalties		X			
7-104.19(b)	Employment of Ocean Going Vessels		X			
7-104.19(c)	Pref. for US Flag Vessels		X			
7-104.98	Hazardous Material Identification and Material Safety Data		X			
7-104.51	Production Progress Report		X			X
7-104.86	Notification of Changes			X		
7-104.94	Capture and Detention			X		
7-104.2	Work Comp. Ins. Defense Base Act			X		
7-104.9(k)	Rights in Technical Data			X	X	X
7-104.64(e)	Govt. Prop. Furn. As Is			X		
7-302.23(b)	Patent Rights-Ret. By Contractor (Long)				X	X
7-104.64(a)	Recovery of Nonrecurring Costs/NonUS Government Sales of Defense Equipment				X	X
7-104.26	Special Test Equipment				X	X
7-104.31(a)	Duty Free Entry					X
	MILSTAMP					X
	Base Support				X	X
AFLC ASPR Sup 7-7503.2	Changes	X	X			

DAR Reference	Title	E-4 Log	C-9 Log	KC-10 Log	E-4 Acq	KC-10 Acq
7-104.27(b)	Option for Incr. Quantitites				X	
	Government Bill of Lading				X	
	Engineer Change Proposal				X	
	Release of Information				X	
	Stabiliz. of Prices, Rent. Wage				X	
	Del. Deliv. of Abstract, New Technology				X	
	Del. Dissem. of Abstr. New Technology				X	
	Add Security Provisions				X	
	Liab. for Other Govt. Prop.				X	
7-103.27	Affirmative Action-Disabled Vets	X		X	X	
7-105.3	Stop Work Orders			X		X
7-104.46	Required Source for Precision Comp/Mech. Time Devices			X	X	X

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E-4B. F19628-74-C-0107. 9 November 1973.

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C-9. F41608-68-C-0001. 10 August 1967.

C-9. F41608-72-C-0048. 10 November 1971.

C-9. F41608-72-C-0049. 1 March 1972.

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