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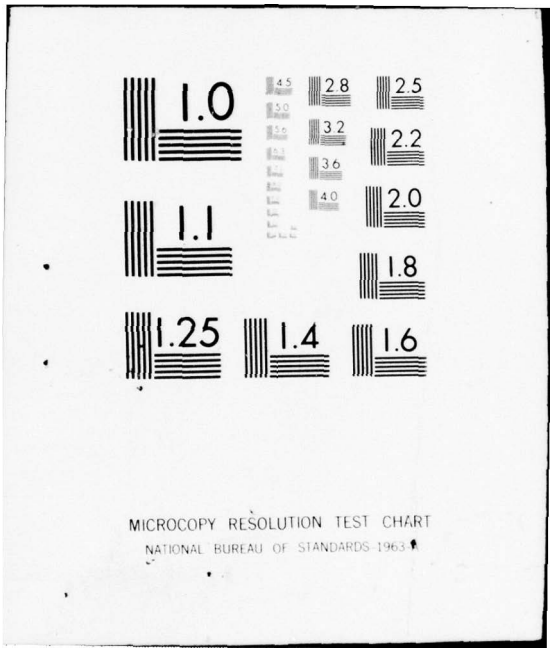
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DEFENSE SYSTEMS MANAGEMENT COLLEGE

PROGRAM MANAGEMENT COURSE
INDIVIDUAL STUDY PROGRAM

ENGINEERING:
WHAT DO WE NEED

STUDY PROJECT REPORT
PMC 77-2

William Steele Smith, Jr.
LCDR USN

FORT BELVOIR, VIRGINIA 22060

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

STUDY TITLE: **ENGINEERING: WHAT DO WE NEED**

STUDY PROJECT GOALS:

To examine sustaining engineering in the services aircraft production contracts and present a methodology for better management of the services procured.

STUDY REPORT ABSTRACT:

The goal of this report is to present a new methodology for procuring engineering services in aircraft production contracts. The proposed methodology was originated at a Naval Plant Representative Office where the author took part in a two year development and implementation effort. Interviews were conducted with government personnel at the procurement policy level of all three services. Additionally, contracts, DCAA audit reports, pre and post award clearances were reviewed for six major aircraft programs in order to further refine the concept presented.

Presented for review and an aid to implementation are the contractual documents used and a narrative description of a prior implementation effort.

SUBJECT DESCRIPTORS:

- Initial Deployment Management:
  - User Developer Liaison (10.10.02)
  - Technical Assistance (10.10.03)
- Production Management, Government Furnished Equipment (10.09.09)
- Procurement Management, Procurement Plan (10.07.02.02)
- Program/Project Management
  - Major Policies (10.02.01)
  - Systems Acquistion Life Cycle (10.02.04)

NAME, RANK, SERVICE	CLASS	DATE
William Steele Smith, Jr. LCDR - USN	**PMC 77-2**	**November 1977**

ENGINEERING:

WHAT DO WE NEED

Individual Study Program

Study Project Report

Prepared as a Formal Report

Defense Systems Management College

Program Management Course

Class 77-2

by

William Steele Smith, Jr.
LCDR USN

November 1977

Study Project Advisor
LtCol J. Arcieri, USAF

EXECUTIVE SUMMARY

This report is a discussion of various aspects of the engineering support (defined as sustaining engineering) normally required of an aircraft manufacturer for the Department of Defense during the production phase of a major program. A case is made for the application of more careful management attention to sustaining engineering, citing several examples of wasted procurement funds.

Several suggestions for better management are examined and then a specific proposal made which would provide program managers the tools needed for more effective management of the engineering effort performed under their production contracts. Actual experience with implementation of the proposed methodology is provided as well as copies of the resulting contractual documents.

ACKNOWLEDGEMENTS

The Author wishes to thank the following individuals who freely gave of their time in interviews and who provided constructive criticism and many helpfull comments. From the NAVAL AIR SYSTEMS COMMAND: Capt. W. Brandel, USN, PMA-235; G. Cammack, AIR-214; R. Watts, AIR-21423; DEPARTMENT of the ARMY READINESS AND MATERIEL COMMAND B. Clemons, DRCPP-S; J. Jury, DRCPP-SP; R. Buckingham, DRCPP-SC; P. Beaumont, DRCPP-SP-B; AIR FORCE SYSTEMS COMMAND R. Taylor, PMY.

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I INTRODUCTION

In weapons system acquistion today the Department of Defense (DOD) is faced with increasing needs to make the very best use of every dollar spent. The issuance of guidance such as contained in Office Of Management And Budget (OMB) circular A-109 and the President's emphasis on implementation of Zero Base Budgeting only highlight the pressures that exist. In aircraft production contracts alone millions of dollars every year are expended. An examination of the Contract Pricing Proposal (DD-633) for any one of these contracts will reveal that a significant portion of the direct effort is accounted for as engineering.

One defense contractor defines this engineering effort as; providing the customer with recurring technical services which are essential to support follow-on production and to support delivered aircraft and technical problems arising from field useage. The above definition applies in general to at least six aircraft manufacturers for the DOD.

Typically this effort can be generally categorized under the headings of project management, fabrication support, Contractor Furnished Equipment (CFE) vendor support, Government Furnished Equipment (GFE) support, government operations support, weapons system supportability analyses and change activity. For the sake of both brevity and clarity the term sustaining engineering will be used to refer to the above listed categories of engineering efforts for the balance of this report.

A general distribution of effort on a typical contract would show:

Project Management	10% of total
Production Support	33% of total
Government Operations Support	33% of total
Change Activity	24% of total

Where fabrication and CFE vendor support have been grouped as production; and GFE support and weapons system supportability analyses have been combined with government operations support.

In a typical contract sustaining engineering will

account for approximately 20.5% of the total price before General and Administrative (G&A) expenses and profit.

Even though sustaining engineering represents a significant portion of the production dollar there has been no viable way to determine exactly what benefit is being gained per dollar expended. In the following section we shall see why greater visibility and control of the sustaining engineering effort needs to be accomplished.

II WHY BOTHER

In a typical aircraft program in full production the next fiscal year follow-on buy of aircraft is usually initiated with a letter contract authorizing the long lead time effort required of the contractor. It is anticipated that the letter contract will be definitized when the production funding for the particular buy had been made available to the program manager. Meanwhile, the contractor is performing work under the letter contract.

This contracting scheme leads to at least two serious problems. When negotiations toward definitization begin the contractor is in the enviable "drivers seat". He is obviously a sole source and he has actual cost data, both historical and recent, to back up his proposal. Because of this situation any previous excess quantity of engineering hours will tend to be perpetuated from contract to contract. Rarely can any of the previous costs be disallowed because the effort will have already been expended on the program in question. As we shall see later the "goldplating" and "gaming" opportunities are significant. An additional problem associated with

the two-stage contracting scheme (letter then definitize) is the "roll over" effect. If attempts are made to negotiate out some engineering hours believed excessive the contractor normally takes the position that most of those hours have already been expended under the letter contract. Thus, "good money follows bad" and any attempts to stop it are effectively thwarted.

It is certainly plausible at this point to say "so what, I get the airplane, I get rapid response from the contractor on questions and fire drills and the cost growth from year to year can be attributed to many factors". That thinking is fine as far as it goes but if the program manager could actually get the aircraft for less, is that not an attractive goal? If a way can be found to make more effective use of the dollars expended is it not worthwhile?

There are two crucial points to note. First, there is currently no direct correlation between dollars expended and services received. Second, whatever unnecessary, unwanted or duplicative services have been provided in the past will continue year after year uninhibited if Government Management action is not taken.

Let us examine what the program manager may typically expect to receive for the sustaining engineering dollars expended. A typical breakout would look something like this:

CATEGORY	SERVICE
Project Management	. Briefing Support
	. Meeting Attendance
	. Project Coordination
Production Support	. Cost effective Manufacture
	. Configuration Control
	. Production Surge Capability
	. Technical Support for Break Out and for second source
Government Operations Support	. Technical Support for GFE interface problems
	. Analysis and recommended solutions for operational and maintenance problems in the field.
	. Technical Support for system integration of support equipment
Change Activity	. Maintenance of up to date drawings, pubs, etc.
	. Suggested designs for system improvements

The above list is not meant to be all inclusive. Many more services are required in the successful introduction and subsequent operation of weapon systems in the field. The program manager under the current structuring of aircraft production contracts has little if any visibility or control over what is actually going on, therefore the potential for expenditure of superfluous engineering effort exists in several, if not all, of the categories.

Some examples of what can happen are; excessive convening of and participation in project related meetings and conferences; inordinate fine tuning of production processes or methods thereby resulting in make work projects; excessive specifications and requirements levied on CFE vendors; overly enthusiastic and prolonged investigation of real or imagined GFE interface problems; unnecessarily detailed and even unneeded response to inquiries from all sorts of government activities; generation of new Ground Support equipment (GSE) "requirements" to solve problems which don't exist; generation of Engineering Change Proposals (ECP's) just for the sake of change, with no expressed interest on the part of the government program manager.

Lest it seem that the author is "tilting at windmills", the author has personal direct knowledge of these and other types of abuse from past experience in Navy field activities. Certainly not all, and probably none, of the major DOD aircraft producers could rightfully be accused of fleecing anyone, but it is true that a major defense contractors pool of engineering talent is his lifes' blood without which he would not long survive. Some documented examples of wasted or misused money are:

1. A contractor whose business base was almost entirely defense oriented spent several engineering man-months on a new method of system checkout to be proposed. He had not been tasked for this effort nor was it of any benefit because the service primarilly involved had already attempted the method and it had proven to be unsatisfactory. In another case the same contractor established a permanent task within the engineering department to study possible weapon system impacts of any government generated (organic) ECP's. This effort was superfluous since the service was responsible for evaluating all system impacts of any organic ECP.
2. A second contractor, with a mixed business base, was found to be pooling its' sustaining engineering labor in

a direct labor pool and allocating the costs to all contracts even though the efforts could be readily identified as to the benefiting contract. It was determined that defense contracts had paid for 85 to 95% of all sustaining engineering labor over the period studied. Thus, costs benefitting commercial contracts directly were borne by DOD contracts. Additionally, proper charging between DOD contracts was not accomplished.

Assuming that competition for fewer program dollars is not likely to abate, it follows that a method of contracting must be developed which recognizes the pressures of the marketplace and ensures that the Department of Defense buy only those engineering services required to continue to field first rate weapon systems. It is also desirable that within the program dollars currently being expended more direct benefit be obtained. This could be achieved if the program manager had the tools with which to properly manage the effort. Let us now examine some previous attempts made to gain some measure of management control.

III HISTORY

Several different attempts have been made in the past to identify the specific sustaining engineering required in a program and contract for it separately.

The Navy utilized what was called a Technical Services Basic Ordering Agreement (BOA) on its F-8 aircraft modification program in the 1968-69 time period. In this approach all sustaining engineering services were provided in a contractual document completely separate from the production contract. This procedure increased government administrative workload and did not provide a viable method of accounting for those aspects of sustaining engineering which are required, at least to some degree, on a continuous basis.

Contracts with the Naval Aviation Engineering Services Unit (NAESU) have been utilized in various programs including the Sparrow program in the early seventies. However, effort contracted from NAESU can only be applied to augment the program managers technical team and sustaining engineering, other than "hard" engineering, is still required.

The Army and Air Force have not contracted for sustaining engineering efforts separately in their aircraft production programs. The Air Force has recently utilized a system similar to what will be proposed in this report to provide sustaining engineering for out-of-production Aeronautical Ground Equipment (AGE) support.

In a recent contract the Navy agreed to pay for a specified minimum level of sustaining engineering. Any additional expenditure would then require that the contract be modified.

Let us now look at some alternative approaches to the problem.

IV SOME SUGGESTED ALTERNATIVES

A suggestion has been made to remove from the basic contract statement of work (SOW) those categories of sustaining engineering effort which are considered as task effort. All other engineering effort would then be contracted for as before. When a specific task effort was required a contract modification would then be negotiated for that effort.

This approach has many problems including some way to ensure that funds required for future task efforts would be available when the time came to obligate them. Another difficulty is that some categories of sustaining engineering are required to some extent all the time but discretionary controls are necessary. Once an activity is included in the SOW and the funds are applied to the contract the contractor makes the decisions about expending the effort. The most significant problem would be the original "roll over" and "good money after bad" situation. In practice nothing would have changed.

Suggestions have also been made to specifically identify funds applied to problem solving and product improvement in production as a new category of research and development (RED) funds. This approach was spurred by the interest of a congressional sub committee in evaluating some of the engineering effort being done under production contracts to see if proper use of procurement funds was being made. The results of that investigation could have a major impact on the future of production contracting in general.

The following is a proposed methodology for providing the visibility, control, flexibility and uniformity of application required to manage sustaining engineering effort in an efficient and economic fashion. The methods proposed will work even if new categories of R & D funding are developed.

V A PROPOSAL

It is proposed that four additional line items be incorporated into DOD aircraft production contracts. The first two of these line items would be entitled Sustaining Engineering-Continuous and Sustaining Engineering-Task respectively. The other two would be supporting data items. The continuous line item would provide for a designated level of sustaining engineering effort to be performed by the contractor. Any other sustaining engineering required would be provided for on a "as needed" basis in response to specific task orders under the task line item. The data line items would provide reports used to monitor activity and provide an historical record. Those categories of effort to be performed under each line item would be specifically identified..

It is believed that the methodology proposed has many significant advantages. First, it would provide both visibility and a measure of control to the program manager enabling him to actually manage the level of engineering support he desired through the use of those monies designated against the task line item. If the total engineering hours applied to the contract were appropriately divided between the

continuous and task line items there would be little room for unilateral maneuvering on the part of the contractor. Secondly, the continuous line item would provide for that level of support the contractor legitimately needs for on-going Class II change activity and production line engineering assistance as well as program management activities. The Program Manager would also retain the flexibility required to enable the contractor to respond to routine inquiries and fire drills. Third, when a task order was being considered for a specific effort the program manager would be able to tell at a glance whether or not sufficient funds remained on the task line item. Under current procedure if performance of a specific task is requested the contractor can do the work if he agrees there is sufficient sustaining engineering money remaining; or he can say that all sustaining engineering effort has been utilized and additional funds are required. Fourth, if the distribution of contract dollars between the continuous and task line items was appropriate the contractor is preempted from getting involved in unwanted expenditures of engineering man power. The program manager is likely to have sufficient funds remaining to initiate efforts he might otherwise never have been able to do. As a program goes

through birth, matures and then begins to age, not only the amount but the character of engineering support required changes. Early in its' history a program will have growing pains; engineering improvements and fixes are frequent. A middle age is achieved where everything is fairly stable and improvements are more in the nature of increased capability. Approaching old age engineering activity picks up due to wearing out of components, etc. and up-date modifications are required. The last major strength of the proposed contracting methodology is its' ability to accomodate such program cycles rather than simply perpetuate what went on the year before. The distribution of funds between the continuous and task line items as well as the overall amount of funds can be modified as required.

As is the case with any system there are some disadvantages. The hue and cry of meddling will reverberate throughout the countryside. Surprisingly, not all of the voices will be contractors. The Navy, due to its' more heavily matrixed organizational structure, will probably suffer more than the other services from the outraged cries of the functional barons who will no longer find it as easy to call their friendly contractor and get unofficial "look-sees" into this or that little problem. Work that should right-

fully be done by the baron and his minions.

There will be times when the contractors response will not be as instantaneous to questions and requests as before, particularly those that will require significant effort. It would be expected that the Contract Administrative Office (CAO) whether it be Naval Plant Representative Office (NAVPRO); Air Force Plant Representative Office (AFPRO); Army Plant Activity (APA) or Defense Contract Administrative Service (DCAS) would negotiate the task orders as well as providing normal administrative services, thus increasing the field activity work load. The definitization and negotiation of task orders by the CAS activity should keep delays in commencement of task order related work to a minimum.

VI EXPERIENCE

An account of what occurred when the implementation of the above methodology was attempted with a major aircraft producer is provided here in the hope it will prove beneficial. The contractual documents that were developed are included as Exhibits 1-16.

As might be expected when this approach was presented the initial reaction was less than enthusiastic. Charges of meddling, hindering and others of less kind nature were received. Initially the contractor was required to provide a report of his government operations support activities. It was agreed the report would contain a brief statement of the effort being accomplished where the request for the effort had come from, the date the effort was started and completed and current status if not completed. It was well recognized that a report of such rudimentary and superficial nature would be insufficient to give an adequate picture of what was taking place. However, it was a starting place from which to proceed.

The report produced some eye opening information. In one case a four month study aimed at proposing an alternate piece of GSE had been initiated by an agency extant to the program office. This study effort was terminated when the program manager saw the effort reported and upon investigating determined he did not desire such a study. After seeing the reports and realizing the amount of activity taking place that he did not necessarily want, the program manager expressed his full support for the implementation of the proposed methodology. At this point the Administrative Contracting Officer (ACO) and the Engineering Division Director in the CAO set about in earnest to negotiate definitions and contractual language with the contractor. Negotiations were rather bumpy but agreement was reached. The wording was approved by the headquarters legal department and incorporated into the next letter contract. In order to form a basis for definitization the contractor was requested to provide a spread sheet showing dollar amounts for each categoty of sustaining engineering against each contract line item to which the sustaining engineering applied. Each element was then evaluated by the appropriate CAO proposal evaluators. Preliminary discussions as to the

apportionment were then begun. Stalemate at the CAO level was reached with the contractor desiring a 77.5% continuous, 22.5% task apportionment and CAO negotiators believing a 60%, 40% division more appropriate. The Procuring Contracting Officer (PCO) at headquarters was provided the CAO position and rationale. The contract was finally signed with the language incorporated but no funding broken out and applied to the sustaining engineering line items. Thus, the entire engineering effort required of the contractor was funded under the Contract Line Item (CLI) for the major end item. The effect was to bar any application of the methodology to to that contract. The reports were still required and continued to show unwanted, unrequired but perfectly legal expenditures.

The apportionment of dollars to the sustaining engineering line items was stymied when the contractor invoked the "roll over" effect mentioned earlier and the PCO was unable to show, in the amount of time available for definitization, how much sustaining engineering effort remained to be definitized. The mechanism was there but too late.

One change in acquisition policy understood to be still in the development stages is a change in the DD-633 format. The major change in the format would call for costing to be provided by contract line item versus category of cost (Exhibit 17). Should this be adopted the contractor would then be compelled to quote directly both continuous and task sustaining engineering effort (if the appropriate line items were there) thereby clearing the major obstacle to implementation.

VII SUMMARY AND RECOMMENDATIONS

We have discussed the weapon system acquisition climate as it relates to aircraft production and pointed out an area of effort within that frame work which has always been looked upon as just "the way business is done". Closer examination shows however, that the "business as usual" treatment of sustaining engineering allows uncounted millions of scarce program dollars to be spent in ways that are at best less than optimal. Futhermore, we have seen that there is a way to do it better. The proposed method is possible to implement and worthwhile doing so for all concerned. For the first time defense contractors can achieve straight forward, easy to see recognition for the assistance they have always rendered to military program managers while at the same time all parties gain the visibility required to eliminate non productive efforts.

Contained in this report have been many generalizations and statements qualified by words like typical, should, etc. This was deliberately done for several reasons. Each service and each contractor have different definitions and different practices. The compromising of my sources and personal

background needed to be avoided. The thrust of this report was philisophical not factual. The report is meant to initiate new thought. New ideas will always be as controversial as these ideas have already proven to be.

My recommendation to the acquisition community is: Begin to think seriously about all facets of how weapons systems are acquired for "business as usual" won't get the job done any longer.

SCHEDULE

Item	Supplies or Services	Quantity	
0022	Contractor Support Spare and Repair Parts for Item 0010 (Exhibit identifiers "GA" thru "GZ" excluding "GI" and "GO" are assigned for use with Item 0022.)	xxxx	(See Section F)
0023	Provisioning Data for Item 0022	xxxx	(See Section F and Exhibit M)*
0024	Maintenance Engineering Analysis (MEA) for Item 0010	xxxx	(See Section F)
0025	Data for Item 0024	xxxx	(See Section F and Exhibit N)*
0026	Integrated Logistics Support Management **	xxxx	
0027	Data for Item 0026 (NSP)	xxxx	(See Exhibit P)*
0028	Calibration/Measurements Requirements Summary (CMRS) for Item 0010	xxxx	(See Section F and Exhibit Q)*
0029	Sustaining Engineering-Continuous ( ) **	xxxx	
0030	Data for Items 0029 and 0033 (NSP)	xxxx	(See Exhibit R)
0031	Sustaining-Engineering-Continuous ( ) **	xxxx	
0032	Data for Item 0031 (NSP)	xxxx	(See Exhibit S)
0033	Sustaining Engineering-Task Support ( ) (Exhibit identifiers "HA" thru "HZ" excluding "HI" and "HO" are assigned for use with Item 0033.)	xxxx	(See Section F)
0034	D E L E T E D.		

*To be incorporated into this contract by bilateral modification at a later date.
**The Contractor is not authorized to make expenditures or incur obligations in performance of Items 0003 through 0008, 0026, 0027, 0029 thru 0032 until such funds are made available by formal modification.

SCHEDULE

Items 0007 and 0008 - The Configuration Management shall be in accordance with Document No. 2-51100/8R-5375, dated 15 July 1968, as amended 14 April 1972, as the aforesaid interprets MIL-STD-480 and Exhibit E (Item 0008), Contract Data Requirements List, DD Form 1423.

Items 0026 and 0027 - The Logistics Support Management and Data to be furnished in accordance with AR-30 dated 1 May 1963, paragraph 3.1.2 and 3.1.4 as amended by Addendum 2D thereto dated 1 April 1974, and Revision No. 2, dated 8 June 1976, and Exhibit P (Item 0027), Contract Data Requirements List, DD Form 1423.

→ Items 0029 and 0031 - The Sustaining Engineering - Continuous called for hereunder shall be in accordance with Attachment (4) entitled "Sustaining Engineering Series Aircraft and Ground Support Equipment".

→ Item 0030 - Separate Sustaining Engineering Reports - Continous and Task Support; shall be submitted in accordance with Exhibit R (Item 0030), Contract Data Requirements List, DD Form 1423 and Attachments #1 and #2 thereto.

Item 0032 - Services Engineering Reports/Status Letters shall be submitted in accordance with Exhibit S (Item 0032), Contract Data Requirements List, DD Form 1423, and Attachment #1 thereto.

EXHIBIT 2

SCHEDULE

Item	Provisioning Document, Specification, or Description of Work
0014	Exhibit H (Item 0014), Contract Data Requirements List, DD Form 1423, and Attachment 6, Technical Manual Contract Requirements Serial No. 6-77 dated 1 March 1976.*
0015, 0016, 0017, 0018, 0019, 0020, 0022, 0023	AR-30 dated 1 May 1963 and Addendum 2D thereto dated 1 April 1974 and Revision No. 2 dated 8 June 1976 and Exhibit J (Item 0017), Exhibit K (Item 0020), and Exhibit M (Item 0023), Contract Data Requirements List, DD Form 1423 and the PRS (Provisioning Requirements Statement) which will be incorporated in the contract by a supplemental agreement issued by the ACO within sixty (60) days after the date of the definitized contract. The ISPPS (Item Support Plan Policy Statement) will set forth the specific Aviation Supply Office implementation instructions which will apply to this procurement. To the extent of any inconsistency between the ISPPS and Addendum 2D, Revision 2 to AR-30, Addendum 2D, Revision 2 shall control.
0033 and 0035	The Contractor shall perform Sustaining Engineering - Task Support called for hereunder, when ordered by the ACO, in accordance with Attachment (4) entitled "Sustaining Engineering Series Aircraft and Ground Support Equipment." No order issued hereunder shall include Contractor Engineering and Technical Services, Contractor Plant Services, Contractor Field Services, or Field Service Representatives to the extent that NAVAIR Instruction 4350.2A of 18 January 1973 requires that contracting therefor be done through the Naval Aviation Engineering Service Unit, Philadelphia, Pennsylvania.
0036	The data called for hereunder shall be in accordance with Exhibit T (Item 0036), Contract Data Requirement List, DD Form 1423, including Attachments #1 and #2 thereto, pursuant to Orders issued by the ACO.

*To be incorporated into this contract by a bilateral modification at a later date.

EXHIBIT 3

Items 0011, 0013, 0017, 0020, 0021, 0023, 0025, 0028, and 0036 - The data to be furnished hereunder shall be delivered in accordance with Exhibits F (Item 0011) G (Item 0013), J (Item 0017), K (Item 0020), L (Item 0021), M (Item 0023), N (Item 0025), Q (Item 0028), and T (Item 0036), Contract Data Requirements List, DD Form 1423, as specified in contract modifications issued by the ACO in accordance with Section F hereof entitled "Description or Specifications". Unless otherwise authorized by the ACO, the data to be furnished hereunder shall be delivered all transportation charges paid by the Contractor.

Item 0014 - The technical manuals to be furnished hereunder shall be delivered in accordance with Exhibit H (Item 0014), Contract Data Requirements List, DD Form 1423, and Attachment (6), Technical Manual Contract Requirements Serial Number 6-77 dated 1 March 1976, as specified in contract modifications issued by the ACO in accordance with Section F hereof entitled "Description or Specifications".

Items 0026 and 0027 - The Contractor shall complete the Integrated Logistics Support Management Services required hereunder during the period 1 April 1978 through 31 March 1979 in accordance with Exhibit P (Item 0027), Contract Data Requirements List, DD Form 1423, within thirty (30) days after delivery of the final aircraft under Item 0001.

→ Items 0029 and 0031 - The Contractor shall perform the Sustaining Engineering-Continuous during the period *.

→ Items 0030 and 0032 - The data to be furnished hereunder shall be delivered in accordance with Exhibit R (Item 0030) and Exhibit S (Item 0032), Contract Data Requirements List, DD Form 1423.

*To be incorporated into this contract by bilateral modification at a later date.

EXHIBIT 4

ATTACHMENT (4)

SUSTAINING ENGINEERING

SERIES AIRCRAFT AND GROUND SUPPORT EQUIPMENT

1.0 Definition - Sustaining engineering is necessary engineering/logistics support directly related to the series aircraft and Ground Support Equipment (GSE).

2.0 Categories - Sustaining engineering consists of two categories: Continuous and Task Support which are described under paragraph 3.0 A and 3.0 B below.

3.0

A. Continuous - The Contractor shall perform the engineering services set forth below on a continuous/recurring bases. Effort hereunder does not require additional contractual authorization or task assignments.

Paragraphs 3.1 through 3.5 A

3.5 B Relative only to those individual efforts less than forty (40) man hours.

3.6 Applicable only to related efforts

3.7 Except as otherwise identified therein as being Task Support related efforts.

3.8 [illegible]

The Contractor will apprise the Government of travel charged to sustaining engineering via weekly meetings between the Government and NAVPRO, such travel being approved and controlled by the Contractor's Program Management Office.

B. Task Support. The Contractor shall, as part of Task Support perform the following:

EXHIBIT 5

17

Paragraph 3.5 B Relative only to those individual efforts exceeding forty (40) man hours.

3.7 Those related efforts specifically identified therein as Task Support.

1

EXHIBIT 6

3.1 PROJECT MANAGEMENT IS:

A. Defining, planning, directing, and controlling technical and administrative efforts related to meeting program/contract objectives.

B. Providing primary technical liaison with the Government.

C. Estimating and justifying follow-on production and new or changed contract requirement (estimates) other than formal customer-responsible Engineering Change Proposals (ECPs). Analyzing program historical data to project ongoing and future program direct cost requirements.

D. Hosting and/or participating in conferences, meetings and reviews.

3.2 PRODUCTION AIRCRAFT FABRICATION SUPPORT IS:

A. In-house support to manufacturing activities through final airport production acceptance and delivery.

B. The identification, investigation and resolution of those problems directly affecting the in-house fabrication of the aircraft including installation and integration of all equipments into the airframe, performance of studies to reduce manufacturing process cost without compromising product quality, and the investigation and resolution of problems encountered during production acceptance flight testing. This effort shall also include, if applicable, the correction of problems first encountered in the field only as identified through paragraph 3.5 procedures for implementation into undelivered aircraft within the constraints imposed by MIL-STD 480 for Class I and II changes.

C. Preparation of associated production changes.

EXHIBIT 7

3.3 [illegible]:

A. The identification, investigation, and resolution of those vendor problems directly affecting the in-house fabrication and performance to contract requirements of the [illegible] aircraft. Technical liaison with vendor on any failure of a purchased item to comply with applicable specifications affecting its acceptance, installation, integration or performance in the [illegible] aircraft.

B. Technical support for alternate vendor selection.

3.4 PRODUCTION AIRCRAFT GFE SUPPORT ACTIVITY

This is support of aircraft GFE and production line GFE test equipment for aircraft components and involves the problem investigation and definition to determine if it is GFE or CFE. Such effort excludes studies and redesign of CFE found to be deficient.

3.5 GOVERNMENT OPERATIONS SUPPORT

Definition - Government Operations Support is effort pertaining to the types of activity set forth below that is not an integral part of the requirements of paragraphs 3.2, 3.3 and 3.4

For in-production series aircraft and related out of warranty GSE, any individual effort covered under paragraph A. below will be performed under the Continuous category. The Contractor will apprise the Government of activities being performed under paragraph A. via weekly meetings between the Contractor and NAVPRO and via a monthly contract report. The monthly report will provide a listing of tasks estimated to be greater than 40

The Contractor will provide man-hour segregation on any of the paragraph A. type tasks if requested by the Government. If the Government disagrees with the Contractor as to whether specific paragraph A. efforts should be performed, the Government may direct the Contractor to stop performing such activities, which direction shall be documented. Notwithstanding any Government direction to stop any such effort as provided herein, if the Contractor deems the activity vital to meeting its contractual obligations, the Contractor may continue performance and segregate allocable costs; and the Contractor and the Government shall settle the dispute as provided by this contract. Any individual effort covered under paragraph B. below less than 40 man-hours on in-production series aircraft and related out of warranty GSE will be performed under the Continuous category.

For out-of-production series aircraft and related out of warranty GSE any individual effort exceeding 40 man-hours will be performed under the Task Support Category. The aircraft shall be considered out of production (OOP) when the last delivery of a particular model aircraft is complete.

A. Reviews and Recommendations Regarding the Following:

(1) Field Technical Reports
(2) Material Improvement Projects
(3) Evaluations/Analyses/Tests
(4) Studies/Reports
(5) Inflight Emergencies

B. Respond to and Provide Recommendations for Government Initiated Requests Regarding the Following:

Note: Any individual effort exceeding 40 man-hours will be performed under the task support category.

EXHIBIT 9

(1) Oral and written communication

(2) Unsatisfactory Reports/ Material Deficiency Reports

(3) Accidents/Incidents/Malfunctions/Teardown Reports

(4) GFE

(5) Organic Proposals

(6) Changes

(7) Bulletins

(8) Standards

C. Actions Recommended. All actions recommended by the above responses that require additional efforts applicable to Government Operations Support will be performed under the Task Support Category.

.6 OUT OF PRODUCTION DATA SUPPORT (AIR FORCE).

A. Maintain an drawing control file at Contractor's facility. Pursuant to this requirement the following instructions shall apply:

(1) Retain all existing basic series aircraft drawings and engineering data. Data will not be updated by the Contractor.

(2) Research historical records of past modifications/conversion programs as required to identify engineering data associated with the programs. Request from those data needed to complete the Contractor's data package.

NOTE:

(i) Historical records and data will be provided by at no cost to the Contractor. Data will be provided in reproducible form.

EXHIBIT 10

(ii) Where a security classification of the requested data is involved, will provide "need-to-know" authorization or will relieve the Contractor from responsibility therefor hereunder.

(3) Maintain files of modification drawings for central control, application indexing and availability for support of future and modification programs. Data will not be updated by the Contractor, nor will it include internal details of sub-system components not a part of the basic series airplane or of modifications engineered by the Contractor.

(4) Maintain and annotate on a continuing basis Automatic Data Processing indices which will identify A/C configuration and the applicable drawings regardless of origin.

B. Take necessary action by annotation to insure wiring diagram integrity throughout the duration of this contract for basic airplanes as delivered by for those modifications by and for those modifications engineered by others for which has been supplied with complete information. Perform control of electrical/electronic wiring diagrams, including issue of wire numbers, reference designators, diagram numbers, etc., for support of and modification requirements.

3.7 WEAPONS SYSTEMS SUPPORTABILITY ANALYSIS is investigation, identification and recommendations on all new and updated GSE hardware and software requirements. All GSERDS except those required in conjunction with ECP's are covered under this paragraph. Authorization and funding of GSERDS generated in connection with ECP's will be handled as part of the ECP process. Any individual effort peculiar to OOP will be included under Task Support. The Contractor will

EXHIBIT 11

apprise the Government of GSERD activities being performed via a weekly meeting between the Contractor and the NAVPRO and the monthly contract report. The report will provide a listing of GSERD's hardware and software tasks and the estimated man-hours for the individual GSERD's. If the Government disagrees with the Contractor as to whether specific efforts should be performed, the Government may direct the Contractor to stop performing such activities, which direction shall be documented. Notwithstanding any Government direction to stop any such effort as provided herein, if the Contractor deems the activity vital to meeting its contractual obligations, the Contractor may continue performance and segregate allocable costs; and the Contractor and the Government shall settle the dispute as provided by this contract.

3.8 CONTRACTOR CHANGE ACTIVITY IS:

A. Effort necessary to study, design, and release approved Contractor-responsibility Class I or Class II changes. Government responsibility changes are not included. The development of new specifications and/or standards are included only if developed for the correction of Contractor responsibil defects and/or Contractor Responsibility Class I or Class II changes.

B. Maintenance of engineering drawings, specifications and standards.

C. Development costs for Government-responsibility proposals not approved and procured shall be a part of the Contractor Change Activity.

4. TASK SUPPORT - The Contractor shall perform sustaining engineering services upon receipt of specific task assignments from the requiring activity as ordered by the ACO. Each task order shall contain a Statement of Work, a completion date, priority of task, and an estimate of cost (man-hours or dollars). All task orders shall bear one of the following priority designations:

Emergency, Urgent, or Routine.

(NOTE: When the Contractor does not agree with the Statement of Work, date of completion or estimated cost (man-hours or dollars) his desired change

shall be transmitted to the Government within 2 working days for an Emergency Priority, within 5 working days for an Urgent Priority, or within 10 working days for a Routine Priority).

EXHIBIT 13

EXHIBIT 141

DRB 2541-A

N00019-76-C-

Exhibit R (Item 0030)

CONTRACT DATA REQUIREMENTS LIST

SYSTEM/ITEM

CONTRACT/PR N00019-77-PR- Rev. 2

CATEGORY E

CONTRACTOR 80378

1. SEQUENCE NUMBER	2. TITLE OR DESCRIPTION OF DATA / 3. SUBTITLE	6. TECHNICAL OFFICE	10. FREQUENCY	12. DATE OF 1ST SUBMISSION	14. DISTRIBUTION AND ADDRESSES (Addressee – Regular Copies/Repro Copies)
4. AUTHORITY (Data Item Number)	5. CONTRACT REFERENCE	7. DD250 REQ / 8. APP CODE (A) / 9. INPUT TO IAC (X)	11. AS OF DATE	13. DATE OF SUBSEQUENT SUBM/EVENT ID	
1. R001	2. Sustaining Engineering Reports Category, Continuous	6. PMA-	10. Monthly	12. See 16	14. PMA- 5/0 PMA- 1/0 NAVPRO 3/0 1/0 1/0
4. See 16	5.	7. LT / 8. / 9.	11. See 16	13. EOM plus 15 days	15. TOTAL 11/0

16. REMARKS

The combined technical & manhour reports shall be prepared in contractor format & contain the information described in Attachment 1.
Block 11- Last day of each accounting month.
~~Block 12- 15th day of month following full month of contract coverage.~~

1.	2.	6.	10.	12.	14.
4.	5.	7. / 8. / 9.	11.	13.	15. TOTAL

16. REMARKS

1. R002	2. Sustaining Engineering Reports Category, Task Support	6. PMA-	10. Monthly	12. See 16	14. PMA- 5/0 PMA- 1/0 NAVPRO 3/0 1/0 1/0
4. See 16	5.	7. LT / 8. / 9.	11. See 16	13. EOM plus 15 days	15. TOTAL 11/0

16. REMARKS

The combined technical & manhour reports shall contain the information described in Attachment 2 & be prepared in contractor format.
Block 11- Last day of each accounting month.
~~Block 12- 15th day of month following full month of contract coverage.~~

1.	2.	6.	10.	12.	14.
4.	5.	7. / 8. / 9.	11.	13.	15. TOTAL

16. REMARKS

APPROVED by NAVAIR DATA REVIEW BOARD for SOLICITATION ONLY. Return contractor priced ~~1423 Form to AIR~~ 52013 for review and Final Approval.
Chairman

PREPARED BY	DATE	APPROVED BY	DATE
:PMA-235			1 JUL 1976

DD FORM 1423 S/N 0102-LF-014-1503 REPLACES EDITION OF 1 APR 66, WHICH IS OBSOLETE.

98 OCT 7 1976

PAGE 1 OF 2 PAGES

Exhibit R(Item 0030)
N00019-77-PR-[illegible] Rev.2
Seq. No. R001

Sustaining Engineering Reports Category,
Continuous

1. Organize the report under the following general headings.

   a. Project management

   b. Fabrication support

   c. Vendor support

   d. GFE support

   e. Government operations support

   f. Out of production data support

   g. Weapons systems supportability analysis

   h. Contractor change activity

2. Tasks in this report are discrete individual efforts exceeding 40 manhours and aggregated routine efforts. Each trip shall be reported as an indvidual task under its appropriate heading.

3. Report the following:

   a. Aircraft type, model, series

   b. Description of tasks

   c. Requestor/source of tasks

   d. Current status of tasks

   e. Summarized results of completed individual tasks

   f. Manhours expended during the reporting period under each heading listed in the preceeding paragraph

EXHIBIT 15

ATTACHMENT 2

Exhibit R(Item 0030)
N00019-77-PR- Rev.2
Seq. No. R001

Sustaining Engineering Reports Category
Task Support

1. Report the following:

   a. Aircraft type, model, series

   b. Task identification number

   c. Task description

   d. Requestor/source of task

   e. Current task status

   f. Summarized results of completed task

   g. Task manhours expended during the peporting period

   h. Cumulative manhours expended on each task

   i. Cumulative manhours expended on all tasks

   j. All travel

2. Summarized results of completed tasks shall be carried for one reporting period only.

EXHIBIT 16

DEPARTMENT OF DEFENSE

CONTRACT PRICING PROPOSAL

FORM APPROVED
OMB NO.

This form is for use in procurements when submission of cost or pricing data is required (See ASPR 3-807).

NAME, ADDRESS, AND TELEPHONE NUMBER OF ORGANIZATIONAL ELEMENT RESPONSIBLE FOR SUPPORTING PROPOSAL	TYPE OF CONTRACT PLACE(S) AND PERIOD(S) OF PERFORMANCE

TOTAL COST PROFIT/FEE TOTAL	TYPE OF PROCUREMENT ACTION ☐ NEW PROCUREMENT ☐ LETTER CONTRACT ☐ CHANGE ORDER ☐ UNPRICED ORDER ☐ PRICE REVISION/REDETERMINATION ☐ OTHER *(Specify)*

LINE ITEM NO.	IDENTIFICATION NOTE: List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer. *(Attach continuation page if required.)*	QUANTITY	TOTAL PRICE	REF.

I. IF YOUR ACCOUNTS AND RECORDS HAVE BEEN REVIEWED IN CONNECTION WITH ANY GOVERNMENT CONTRACT (PRIME OR SUBCONTRACT), GRANT OR PROPOSAL WITHIN THE PAST 3 YEARS BY A GOVERNMENT AGENCY OTHER THAN IRS OR GAO, PROVIDE NAME, ADDRESS AND TELEPHONE NUMBER.

CONTRACT ADMINISTRATION OFFICE	AUDIT OFFICE

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK?
☐ YES ☐ NO *IF YES, IDENTIFY*

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?
☐ YES ☐ NO *IF YES, IDENTIFY:* ☐ ADVANCE PAYMENTS ☐ PROGRESS PAYMENTS *OR* ☐ GUARANTEED LOANS

IV. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS?
☐ YES ☐ NO *IF YES, IDENTIFY ITEM(S), CUSTOMER(S) AND CONTRACT NUMBER(S):*

V. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES AND ASPR SECTION XV COST PRINCIPLES?
☐ YES ☐ NO *IF NO, EXPLAIN.*

VI COST ACCOUNTING STANDARDS BOARD (CASB) DATA (PUBLIC LAW 91-379 AS AMENDED):

a. WILL THIS PROCUREMENT ACTION BE SUBJECT TO CASB REGULATIONS?
☐ YES ☐ NO *IF NO, EXPLAIN.*

b. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB-DS-1 or 2)?
☐ YES ☐ NO *IF YES, SPECIFY THE OFFICE TO WHICH SUBMITTED AND IF DETERMINED TO BE ADEQUATE.*

c. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NONCOMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS?
☐ YES ☐ NO *IF YES, EXPLAIN.*

d. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS?
☐ YES ☐ NO *IF YES, EXPLAIN.*

This proposal is submitted in response to (RFP, contract/mod, etc.) _____ and reflects our best estimates and/or actual costs as of this date, in accordance with the instructions of this form.

TYPED NAME AND TITLE	SIGNATURE

NAME OF FIRM	DATE OF SUBMISSION

DD FORM 633

Previous editions are obsolete.

EXHIBIT 17

INSTRUCTIONS

1. The purpose of this form is to provide a vehicle whereby the offeror submits to the Government a pricing proposal of estimated and/or incurred costs by contract line item with supporting information, adequately cross-referenced, suitable for detailed analysis. A cost element breakdown, using the applicable format prescribed in 7A, B or C below, shall be attached for each proposed line item, and must reflect any specific requirements established by the Contracting Officer. Supporting breakdowns must be furnished for each cost element, consistent with the offeror's cost accounting system (job order or process). Depending on the offeror's system, breakdowns shall be provided for the following basic elements of cost, as applicable:

Materials – Provide a consolidated priced summary of individual material quantities included in the various tasks, orders or contract line items being proposed, and basis for pricing (vendor quotes, invoice prices, etc.).

Subcontracted Items – Include parts, components, assemblies and services to be produced or performed by other than you in accordance with your design, specifications or directions and applicable only to the prime contract. For each subcontract over $100,000, the support should provide a listing by source, item, quantity, price, type of subcontract, degree of competition and basis of establishing source and reasonableness of price, as well as results of review and evaluation of subcontract proposals when required by ASPR 3-807.

Standard Commercial Items – Consists of items which you normally fabricate, in whole or in part, and are generally stocked in inventory. Provide appropriate explanation of basis of pricing. If based on cost, provide cost breakdown; if priced at other than cost, provide justification for exemption from submission of cost or pricing data as required by ASPR 3-807.

Interorganizational Transfers (at other than cost) – Provide explanation of pricing method used as required by ASPR 15-205.22.

Raw Material – Consists of material which is in a form or state that requires further processing. Provide priced quantities of items required for this proposal.

Purchased Parts – Includes material items not covered above. Provide priced quantities for items required for this proposal.

Interorganizational Transfers (at cost) – Include separate breakdown of cost by element.

Direct Labor – Provide a time-phased breakdown of labor (hours, rates, cost) by appropriate category and furnish basis for estimates.

Indirect Costs – Indicate the method of computation and application of your indirect costs, including cost breakdowns, and showing trends and budgetary data, to provide a basis for evaluation of the reasonableness of proposed rates. Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representatives on use of forward pricing rates, identify the agreement and describe the nature thereof.

Other Costs – List all other costs which are not otherwise included in the categories described above (e.g., special tooling, travel, computer and consultant services, preservation, packaging and packing, spoilage and rework, and Federal excise tax on finished articles) and provide basis for pricing.

Royalties – If amount exceeds $250, the offeror must submit a DD Form 783 Royalty Report or its equivalent.

Facilities Capital Cost of Money – The offeror must submit Form CASB-CMF and show calculation of proposed amount.

2. As part of the specific information required by this form, the offeror must submit and clearly identify as such, accurate, complete and current cost or pricing data as defined in ASPR 3-807, in sufficient detail to enable the Contracting Officer or his authorized representative to evaluate the proposal. In addition, the offeror must submit any information reasonably required to explain his estimating process, including: (i) the cost escalation and other judgmental factors applied, (ii) the mathematical or other methods used in the estimate, including those used in projecting from known data, and (iii) any contingencies.

3. There is a clear distinction between "submitting" cost or pricing data and merely "making available" books, records and other documents without identification. The requirement for submission of cost or pricing data is met when all accurate cost or pricing data reasonably available to the contractor has been submitted, either actually or by specific identification, to the Contracting Officer or his authorized representative. As later information comes into the contractor's possession, it should be promptly submitted to the Contracting Officer. The requirement for submission of cost or pricing data continues up to the time of final agreement on price.

4. **In submitting this form, the offeror must include an index**, appropriately referenced, of all the cost or pricing data and information accompanying or identified in the form. In addition, any future additions and/or revisions, up to the date of agreement on price, must be annotated on a supplemental index.

EXHIBIT 17A

5. By submission of this proposal, the offeror, if selected for negotiation, grants to the Contracting Officer, or his authorized representative, the right to examine those books, records, documents and other supporting data which will permit adequate evaluation of the proposed price. This right may be exercised at any time prior to award.

6. As soon as practicable after final agreement on price, but prior to the award resulting from the proposal, the offeror shall, under the conditions stated in ASPR 3-807, submit a Certificate of Current Cost or Pricing Data.

7. **HEADINGS FOR SUBMISSION OF LINE ITEM COST SUMMARIES:**

A. New Procurements

COST ELEMENTS	PROPOSED CONTRACT ESTIMATE		
	Total Cost(1)	Unit Cost(2)	Reference(3) 6

(1) Enter those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., letter contract or unpriced order), describe them on an attached supporting schedule. When "preproduction" or "start-up" costs are significant or when specifically requested in detail by the Contracting Officer, provide a full identification and explanation of same.

(2) Optional except where required by the Contracting Officer.

(3) Attach separate pages as necessary and identify in this column the attachment in which the information supporting the specific cost element may be found.

B. Change Orders

COST ELEMENTS	PROPOSED CHANGE ESTIMATE					
	COST OF WORK DELETED			COST OF WORK ADDED(4)	NET COST OF CHANGE(5)	REFERENCE (1)
	Estimated Cost of all Deleted Work(1)	Cost of Deleted Work Already Performed(2)	Net Cost To Be Deleted(3)			

(1) The "estimated cost of all deleted work" includes (i) estimates of what the cost would have been (as of the effective date of the change) to complete deleted work not yet performed, and (ii) the cost of deleted work already performed.

(2) The "cost of deleted work already performed" is the incurred cost of such work, actually computed if possible, or estimated in the contractor's accounting records. Attach a detailed inventory of work, materials, parts, components, and hardware already purchased, manufactured, or performed and deleted by the change, indicating the cost and proposed disposition of each line item. Also, if the contractor desires to retain such items or any portion thereof, indicate amount offered therefor.

(3) The "net cost to be deleted" is the "estimated cost of all deleted work" less the "cost of deleted work already performed."

(4) When nonrecurring costs are significant or when specifically requested in detail by the contracting officer, provide a full identification and explanation of same.

(5) The "net cost of change" is the "cost of work added" less the "net cost to be deleted." When this result is a negative amount, place the amount in parentheses.

(6) Refer to 7A(3) above.

EXHIBIT 17B

C. Price Revision/Redetermination

CUTOFF DATE[1]	NUMBER OF UNITS[2]		AMOUNT OF		
	COMPLETED	TO BE COMPLETED	CONTRACT	REDETERMINATION PROPOSAL	DIFFERENCE

COST ELEMENTS (7) & (8)	INCURRED COSTS				ESTIMATED COST TO COMPLETE[5] (e)	ESTIMATED TOTAL COST (d+e)	REFERENCE (6)
	Pre-production[3] (a)	Completed Units[4] (b)	Work in Process[4] (c)	Total (a+b+c) (d)			

[1] Enter the cut-off date required by the contract, if applicable.

[2] Enter the number of units completed during the period for which experienced costs of production are being submitted and the number of units remaining to be completed under the contract.

[3] Enter all costs incurred under the contract prior to starting production and other nonrecurring costs (usually referred to as "start-up" costs) from your books and records as of the cut-off date. These include such costs as preproduction engineering, special plant rearrangement, training program, and any identifiable nonrecurring costs such as initial rework, spoilage, pilot runs, etc. In the event the amounts of the foregoing are not segregated in or otherwise available from your records, enter in this column your best estimates of such costs. Explain the basis for each estimate and how such costs are charged on your accounting records (e.g., included in production costs as direct engineering labor, charged to manufacturing overhead, etc.). Also show how such costs would be allocated to the units at their various stages of contract completion.

[4] Enter in column (b) the production costs from your books and records (exclusive of preproduction costs reported in column (a)) of the units completed as of the cut-off date. Enter in column (c) the costs of Work-in-Process as determined from your records or inventories at the cut-off date. When the amounts for Work-in-Process are not available in your records but reliable estimates for them can be made, enter the estimated amounts in column (c) and enter in column (b) the differences between the total incurred costs (exclusive of Preproduction Costs) as of the cut-off date and these estimates. Explain the basis for such estimates, including identification of any provision for experienced or anticipated allowances, such as shrinkage, rework, design changes, etc. Furnish experienced unit or lot costs (or labor hours) from inception of contract to the cut-off date, improvement curves, and any other available production cost history pertaining to the item(s) to which your proposal relates.

[5] Enter those necessary and reasonable costs which in your judgment will properly be incurred in completing the remaining work to be performed under the contract with respect to the item(s) to which your proposal relates.

[6] Refer to 7A(3) above.

[7] Where residual inventory exists, the final costs established under FPI and FPR arrangements should be net of the fair market value of such inventory.

[8] In support of subcontract costs, a listing shall be submitted of all subcontracts subject to repricing action, annotated as to their status.

EXHIBIT 17C

REFERENCES

1. U. S. Navy contract N00019-76-C-0428.

2. Defense Contract Audit Agency Audit Report No. 110-99-3-0157 dated May 15, 1973.

3. Pre and Post Negotiation Clearances for FY 7T/77 for the A-6, EA-6B, F-14, S-3A and A-4 series aircraft contracts.

NOTE: Due to sensitivity of information in the above cited references, material was used on an indirect basis only.