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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report presents an analysis of the flow-down of risk reducing and incentive provisions from prime contracts to selected, associated subcontracts for four major weapon systems: The XM1 tank, YAH-64 helicopter, Harpoon missile, and B-1 bomber. Emphasis was placed on the subcontracting precepts and practices of prime contractors with analysis based on the comparisons of contracts and comments from four primes and selected subcontractors.

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SUBCONTRACTING POLICY IN MAJOR SYSTEMS ACQUISITIONS

November 1978

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EXECUTIVE SUMMARY

The purpose of this study was to assess the effect of prime contractors' subcontracting precepts and practices on major system acquisitions, and to recommend DoD requirements governing application of prime contract provisions to associated subcontractors. In conducting this study, we analyzed the contracts of 4 prime contractors and 18 subcontractors associated with four major weapon systems: the XM1 tank, the YAH-64 helicopter, the Harpoon missile, and the B-1 bomber.

Our overall assessment of the precepts and practices of the prime contractors involved in this study is that they support the successful operation of the subcontracting process as it relates to major systems acquisitions.

In general, the subcontracting process is functioning satisfactorily within existing DoD guidelines. Subcontractors occasionally have problems when inappropriate contract types or inappropriate option clauses are used, but generally both prime contractors and subcontractors are satisfied with their working relationships.

The major findings which support these conclusions are:

- Prime contractors adhere to DoD regulations in subcontracting.
- Prime contractors have established procedures for competitive subcontracting.
- Subcontractors actively seek work on defense programs.
- Prime contractors attempt to balance risk and contract type.
- Contract type is more closely related to the size of the subcontract than to the size of the subcontractor, in development programs.
- Some subcontractors have suffered because they had an inappropriate contract type or a contract with fixed-price options.
- Subcontractors generally accept the contract type dictated by the prime, but sometimes reluctantly.

In light of these findings and conclusions, we do not recommend any new mandatory flow-down of prime contract provisions to associated subcontractors. However we do recommend that:

- The DoD should continue to use the Contractor Procurement System Review to monitor the selection of subcontract type, particularly in the case of high-risk subsystems.

- The Defense Acquisition Regulation should specify that development subcontracts with firm-fixed-price or ceiling price options for long-term or large quantity buys be accompanied by provisions for economic price adjustments.

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1. INTRODUCTION

To develop and produce complex weapon systems, even large defense contractors subcontract for the production of many major subsystems. These subsystems often influence weapon system cost and performance substantially. It has been asserted that about half the funds spent for weapons acquisition go to subcontractors.[1] Consequently, the subcontracting process is a major concern of DoD management.

It has been alleged that subcontractors often face high risks and are at a significant disadvantage when dealing with large prime contractors on such matters as price, payment schedules, and termination protection. Apprehension has been expressed that, if these subcontractors go out of business or diversify more into commercial markets, competition and efficiency could be significantly reduced, resulting in higher weapons costs. DoD is also interested in keeping subcontractors in the defense industrial base to preserve their specialized skills and to maintain an adequate level of surge capacity.

Some people have proposed that DoD amend its acquisition policy to ensure that risk-reducing and incentive features of prime contracts are equitably passed on to the subcontractors for major subsystems. Others have maintained that concern about subcontracting policy is unfounded and that further regulation would be an unwarranted intrusion into the primes' internal business decisions and make the acquisition process less efficient. To make a fully informed judgment on this matter, DoD needs adequate data on the subcontracting practices of major weapon system contractors.

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[1] L. C. Jackson, "Subcontract Management: Program Office Involvement on Cost-Plus-Incentive-Fee Prime Contracts," Defense Systems Management School, October 1977, p.12.

Hence this study was undertaken for the Director, Contracts and Systems Acquisition, Undersecretary of Defense for Research and Engineering. We examined the subcontracting of major, critical subsystems in the full-scale development phase of four weapons programs: the XM1 tank, the YAH-64 helicopter, the Harpoon anti-ship missile, and the B-1 bomber. Table 1 indicates the contract data base on which the study was conducted by presenting, for each program, the producing companies, their products, and the subcontractors' sizes and locations.

A. OBJECTIVE

Our overall objective was to identify and assess the effect of prime contractors' subcontracting precepts and practices on major system acquisitions, in order to recommend DoD requirements governing the application of prime contract provisions to associated subcontracts.

B. REPORT ORGANIZATION

Section 2 describes the methodology of this study. Sections 3 and 4 contain our findings; Section 3 is an analysis of prime contract and subcontract features, and Section 4 is an analysis of data on the subcontracting process and related opinions obtained from the 4 primes and 18 subcontractors. Section 5 presents LMI's conclusions and recommendations for improving the subcontracting process.

Major Weapon System	Company	Product	Subcontractor Size*	Subcontractor Location
XM1 Tank	Chrysler	Total System		
	AVCO Lycoming	Turbine Engine	Large	Stratford, CT
	Cadillac Gage	Turret Drive and Stabilization	Small	Warren, MI
	Detroit Diesel Allison	Transmission and Final Drive	Large	Indianapolis, IN
	Kollmorgen Corp.	Gunner's Auxiliary Sight	Medium	Northampton, MA
	Singer Kearfott	Line of Sight Data Link	Large	Clifton, NJ
YAH-64 Helicopter	Hughes Helicopter	Total Airframe		
	Advanced Structures	Rotor Blades	Small	Monrovia, CA
	Bertea	Hydraulics	Small	Irvine, CA
	Menasco	Landing Gear	Medium	Burbank, CA
	Teledyne-Ryan AERO	Airframe Structure	Large	San Diego, CA
	Western Gear	Gear Box (Intermediate and Tail)	Medium	City of Industry, CA
Harpoon Missile	McDonnell Douglas	Total System		
	Aerojet General	Rocket Motor Booster	Large	Sacramento, CA
	Sperry Rand	Fire Control System	Large	Great Neck, NY
	Texas Instruments	Seeker	Large	Dallas, TX
B-1 Bomber	Rockwell International	Total Airframe		
	Harris	Electronic Multiplexing System	Large	Melbourne, FL
	Kaman	Fairings & Rudders	Medium	Bloomfield, CT
	Martin-Marietta	Horiz/Vert Stabilization	Large	Baltimore, MD
	Sierracin	Windshields	Small	San Fernando, CA
	Sterer	Nose Wheel Steering	Small	Los Angeles, CA

*Company size categories: Subcontractors were divided into three groups based on company or corporate sales for 1976. Large companies had sales greater than $300 million; medium size companies had sales between $50 and $299 million; and small companies had sales less than $50 million. These categories are consistent with previous LMI reports, such as The Defense Industrial Base Study, LMI Task 76-2, August 1977.

2. METHODOLOGY

To meet the objectives of this study within the given budget and schedule, several constraints were imposed:

- Four major weapon system programs at or beyond DSARC III review were analyzed.
- Examination of the programs was limited to the full-scale development phase on the assumption that subcontractor risk was greatest in that phase.
- The subcontracts applied to major critical subsystems, which were assumed to be more risky than supply subcontracts.
- The number of subcontractors was limited to 18, because of the intensiveness of the interview process and the analysis.

The small size of this sample precludes using it to make extensive observations about the entire defense industrial base. However, we believe this sample is large enough to provide indications of any widespread problem.

The study concentrated on the subcontracting process and on selected related subcontracts and was conducted in six steps, as follows:

1. Select weapon system programs and prime contractors.
2. Interview prime contractors.
3. Select subcontractors.
4. Interview subcontractors.
5. Analyze prime and related subcontracts.
6. Analyze interview data.

Each step is explained in detail below.

A. SELECT WEAPON SYSTEMS AND PRIME CONTRACTORS

The initial step was to identify and select major weapon systems suitable for the study. These choices dictated which prime contractors would be asked to participate.

The OSD Study Monitor chose the four weapon systems from an LMI-prepared list of candidates that met the following criteria:

- The weapon system was in, or had recently completed, full scale development.
- The major subcontractors were undercontract just prior to, or during, the study period.
- There was at least one weapon system from each Military Department.
- The prime contractors agreed to participate in the project and to assist in securing the participation of their subcontractors.

B. INTERVIEW PRIME CONTRACTORS

After the prime contractors agreed to participate, we conducted two rounds of interviews with each. The first addressed subcontracting precepts and practices, emphasizing those areas highlighted in the task order. A second interview was directed at the prime's dealings with specific subcontractors. This second round of interviews was carried out after the subcontractor selection process was completed.

The topics covered in the interviews included: the make-or-buy decision process, source selection, and contract pricing and negotiations. In addition, there were questions about Government involvement in subcontracting.

C. SELECT SUBCONTRACTORS

The choice of weapon systems and prime contractors was followed by the selection of subcontractors, subject to the Study Monitor's and the primes' approval. Four or five subcontractors working on each weapon program were selected to be interviewed. The group of companies was selected for the following reasons:

- Each subcontractor produced either:
  - a major subsystem, as indicated by the cost of the product supplied
  - a subsystem designated as critical, although not necessarily a high-cost item.
- As a group, the selected subcontractors:
  - represented companies of various sizes (based on sales volume)
  - produced items spread among a number of product lines
  - had both cost-reimbursement and fixed-price types of contracts.

- Companies who had contract difficulties were included.
- When possible, companies replaced during the development phase or during the transition from development to production were also included.
- Companies located within several geographic areas were selected to facilitate the data collection effort and to limit its cost.
- Companies selected were approved by the prime contractors.

D. INTERVIEW SUBCONTRACTORS

After receiving approval to contact the subcontractors, we interviewed them, using a standard interview guide to ensure uniformity in our questioning. The topics were basically the same as those covered in the prime contractor interviews, but approached the process from the subcontractors' point of view: solicitations; competition; contract pricing and negotiations, including contract type; and relations with the Government.

E. ANALYZE PRIME AND RELATED SUBCONTRACTS

During the interview phase, we obtained copies of the development contracts between the Government and the primes, and between the primes and their subcontractors. We then compared selected characteristics of each prime contract and its related subcontracts. The areas reviewed were: product; contract type; contract amount; and key clauses such as changes, options, payments, deliveries, inspection and correction of defects, and terminations.

The purpose of this comparison was to look at the flow-down of risk from the prime contractors to their subcontractors, with the intention of judging whether the primes gave subcontractors contracts with features consistent with the risk involved in performing. Our findings are reported in Section 3.

F. ANALYZE INTERVIEW DATA

Following the comparison of prime contracts and subcontracts, we analyzed the interview data. The responses to the questionnaire were tabulated for prime contractors and subcontractors. We also cross-checked the responses of prime contractors with those of their subcontractors and with the data available in the contracts. These findings appear in Section 4.

3. FINDINGS--CONTRACT AND SUBCONTRACT FEATURES

This section presents findings about the types of contracts and clauses used at the prime contractor and subcontractor levels. It begins with a brief description of each of the four weapon programs studied, including the selection of a prime contractor and the type of contract each was awarded. This description is followed by an analysis of subcontract types by size of subcontract and size of subcontractor. The final part of this section contains findings about the flow-down of contract features that reduce risk and provide incentives, based on a comparison of the prime contracts and related subcontracts.

A. CONTRACTOR BACKGROUND

The weapon systems and prime contractors included in this study were: the XM1 tank--Chrysler Corporation; the YAH-64 Advanced Attack Helicopter--Hughes Helicopter (a division of the Summa Corporation); the Harpoon anti-ship missile--McDonnell Douglas Corporation; and the B-1 bomber--Rockwell International Corporation.

1. XM1 Tank

In 1973, Chrysler and General Motors were awarded contracts to build prototype vehicles that would serve as the basis for selecting one of them to manufacture a new main battle tank. In 1976, the Army contracted with Chrysler for the full-scale engineering development of the XM1. A key factor in this contract was the inclusion of a design-to-cost target. Chrysler was awarded a cost-plus-incentive-fee (CPIF) contract valued at roughly $195 million and was given the opportunity to earn award fees based on meeting design-to-cost goals. It, in turn, subcontracted for the development of key subsystems, whose value amounted to about 55 percent of the prime contract award.

2. YAH-64 Helicopter

The Advanced Attack Helicopter program began in 1973, when the Army awarded Hughes and Bell contracts to proceed with competitive development. Each company then submitted its prototype to the Army for test and evaluation. The Hughes prototype was selected, and in 1976, the Army awarded Hughes a CPIF contract for approximately $317 million to proceed with a full-scale development and testing program. The Army included a provision for an award fee if Hughes could meet a production design-to-cost target.

Hughes had teamed up with its major subcontractors for the first development phase. After winning the competition for the second development phase, Hughes stayed with the team concept and subcontracted about 40 percent of the prime contract award. To date, this has been a successful approach, popular with both the Government and the subcontractors. The YAH-64 is due to enter production in 1980.

3. Harpoon Missile

The Harpoon anti-ship missile was developed for the Navy by the McDonnell Douglas Astronautics Company. A design contract was awarded to McDonnell in 1971 after a competitive selection.

In 1973, McDonnell Douglas began full-scale development under a CPIF contract valued at about $113 million. Of that amount, about 30 percent was subcontracted. Several of the McDonnell subcontractors had been team members during the original competition and maintained that relationship into the production phase that began in 1976.

4. B-1 Bomber

The Air Force awarded a contract to North American Rockwell[2] in mid-1970 for the initial development of a strategic bomber. In late 1970, Rockwell began full-scale

[2]The Corporation has since been renamed Rockwell International.

development under a CPIF contract. This contract was funded for approximately $2.36 billion. A key feature of this contract was the provision for an award fee based chiefly on management criteria. Rockwell used many subcontractors, who received a total of about 55 percent of the available funds.

Production of the B-1 was to begin in 1976, but the funding for these aircraft was cancelled, and the remainder of the program has been terminated. During the time of this study, Rockwell was in the process of settling the termination claims of its subcontractors.

B. SUBCONTRACT DISTRIBUTION

It was not possible to obtain the desired mix of subcontracts within each program. Although there was an even split of cost-reimbursement and fixed-price subcontracts for three of the four weapons programs, the fourth included only subcontractors with cost-reimbursement contracts. It was also difficult to include as many small and medium-size companies as desired, because the companies producing the major components usually were the larger subcontractors.

Of the companies selected, 9 were classified by us as large, 4 as medium, and 5 as small. Seven subcontractors had firm fixed-price (FFP) contracts; eleven had cost-reimbursement-type contracts. Table 2 shows the subcontracts by type, amount, and subcontractor size; and the size classifications.

All subcontracts greater than $6 million were awarded to large companies. Six of the seven subcontracts were of a cost-reimbursement-type. Among the small and medium companies, all subcontracts were valued below $6 million. The contract types were more varied for these smaller subcontracts. Six were fixed-price-type and five were cost-reimbursement-type.

When contract type and size were analyzed for all major or critical subcontracts considered for inclusion in this study, the results (Table 3) supported the observations from the sample of participating subcontractors above. Of the 14 subcontracts valued above $6 million, all were held by large companies, and 11 were cost-reimbursement-type.

TABLE 2. NUMBER OF SUBCONTRACTS BY TYPE, AMOUNT, AND SUBCONTRACTOR SIZE

(Selected Subcontractors Only)

Size of Subcontractor *	Small				Medium				Large				Totals
Amount (millions) of Subcontract:	<$6	$6-10	$11-20	>$20	<$6	$6-10	$11-20	>$20	<$6	$6-10	$11-20	>$20	
Subcontract Type													
CPFF	1	-	-	-	-	-	-	-	-	-	-	-	1
CPIF	2	-	-	-	1	-	-	-	1	1	2	3	10
FFP	2	-	-	-	3	-	-	-	1	-	1	-	7
Totals	5	-	-	-	4	-	-	-	2	1	3	3	18

*Company size categories: Subcontractors were divided into three groups based on company or corporate sales for 1976. Large companies had sales greater than $300 million; medium size companies had sales between $50 and $299 million; and small companies had sales less than $50 million. These categories are consistent with previous LMI reports, such as the Defense Industrial Base Study, LMI Task 76-2, August 1977.

TABLE 3. NUMBER OF SUBCONTRACTS BY TYPE, AMOUNT, AND SUBCONTRACTOR SIZE

(Major/Critical Subcontractors)

Size of Subcontractor:*	Small				Medium				Large				Totals
Amount (millions) of Subcontract:	<$6	$6-10	$11-20	>$20	<$6	$6-10	$11-20	>$20	<$6	$6-10	$11-20	>$20	
Subcontract Type													
CPFF	1	-	-	-	-	-	-	-	1	-	-	-	2
CPIF	2	-	-	-	1	-	-	-	4	3	5	3	18
FFP	7	-	-	-	4	-	-	-	14	2	1	-	28
Totals	10	-	-	-	5	-	-	-	19	5	6	3	48

*Company size categories: Subcontractors were divided into three groups based on company or corporate sales for 1976. Large companies had sales greater than $300 million; medium size companies had sales between $50 and $299 million; and small companies had sales less than $50 million. These categories are consistent with previous LMI reports, such as the Defense Industrial Base Study, LMI Task 76-2, August 1977.

Of the 34 subcontracts priced below $6 million, 15 went to small or medium subcontractors and the remainder to large companies.

For subcontracts below $6 million, contract type does not appear related to subcontractor size. As shown in Table 3, 4 of the 15 low dollar subcontracts with small and medium-size companies (27 percent) were cost-reimbursement-type contracts, while 5 of the 19 low dollar subcontracts held by large companies (26 percent) were also cost-reimbursement-type.

C. CONTRACT COMPARISONS

The flow-down of risk-reducing and incentive features from the prime contractors to their subcontractors was analyzed, with emphasis on: contract types; incentive fees and sharing arrangements for CPIF contracts; award fee agreements; and key contract clauses dealing with such topics as changes, options, acceptances, inspection and correction of defects, deliveries, terminations, and subcontractor appeals. Findings about each of these contract features are presented below.

1. Contract Type

A prime contractor having a cost-reimbursement-type contract with the Government can give its subcontractors the same type of contract without increasing its own risk. However, in doing so, a prime may reduce its own chances of achieving the incentive cost target, and that could result in a lower fee to the prime and higher cost to the Government.

All four of the prime contractors studied had CPIF contracts. For three, the incentive fee was based only on meeting the target cost criteria. For the other, the fee could be adjusted up or down, based on the performance of the equipment during testing.

Of the 18 participating subcontractors, 10 had CPIF contracts and 1 had a cost-plus-fixed-fee (CPFF) contract. The remaining seven had FFP contracts. The single

CPFF contract was the lowest-risk type of contract included in this study. The Defense Acquisition Regulation (DAR)[3] describes a CPFF contract as less risky than a CPIF contract or any fixed-price type of contract. A CPFF contract was negotiated in this case because the subcontractor was to meet the prime's specifications, which were not complete at the time the contract was signed.

2. Fees and Sharing Arrangements

CPIF contracts include a range of fees and a sharing arrangement. The minimum, target, and maximum fees and the ratios established for sharing differences in actual and target costs indicate the extent of incentive the contractor has been given.

It is to the buyer's advantage to give the seller a broad range of fees, so as to encourage cost-reducing activities. When the fee range is narrow, the contractor earns almost the same fee, whether or not costs are tightly controlled.

It is also advantageous to have a contractor share in cost overruns and underruns. Sharing results in additions to, or reductions of the target fee and should provide incentive to keep actual costs below cost targets. According to the DAR (3-405.4(a)), "The provision for increases or decreases in fee is designed to provide an incentive for maximum effort on the contractor to manage the contract effectively." However, with a narrow fee range, the sharing loses much of its impact.

[3]The Defense Acquisition Regulation (DAR) was called the Armed Services Procurement Regulation (ASPR) when the contracts studied were signed. At the time of conversion to the DAR, the sections and paragraphs were not renumbered. Hence, references are the same in both documents. For a discussion of contract types, see Section III, 401.(a)(1).

The fee sharing arrangements between the Government and the prime contractors appear in Table 4.

TABLE 4. PRIME CONTRACTOR FEES AND SHARING RATIOS

Contractors	Target Fee Incentive	Incentive Fee Ranges	Underruns Gov't/Prime	Overruns Gov't/Prime
1	5.5	0-13	90/10	90/10
2	8.0	0-12	80/20	80/20
3	8.0	2-12	70/30	70/30
4	8.0	6-12	65/35	80/20

The primes generally gave CPIF subcontractors fee ranges slightly narrower than those in the related prime contracts, and cost-sharing ratios identical or very similar to their own.

3. Award Fees

Of the four prime contracts studied, three had award fee provisions. In two cases, the fee was based on the contractors' ability to meet design-to-unit-production-cost targets. In the third, the award fee was tied to specific prime contractor management goals. The amount of the award fee was to be determined unilaterally by the Government in all cases and was not to exceed an established amount.

Only one prime contractor passed on award fee provisions to its subcontractors. That one did so for all subcontractors regardless of contract type. It also had the right to determine the subcontractors' award fees unilaterally.

4. Changes

The four prime contracts each had a changes clause that referenced ASPR 7-104 or used language based on it. Such clauses permit the Government to issue changes unilaterally and provide for equitable adjustments in the primes' prices and delivery schedules.

In most cases, the primes passed on to their subcontractors an ASPR changes clause or some equivalent. Frequently, the time for a subcontractor to assert a claim was shorter than that allowed the prime. This appeared justified to the primes because they would need to know if subcontractors would be asserting claims to them before they could assert their claims to the Government.

One prime gave subcontractors a changes clause that granted the prime greater latitude as a buyer than the Government had. Specifically, the prime had the right to change production quantities and delivery schedules. The clause provided for equitable adjustments in price, but it reduced the subcontractor's flexibility and may have caused potentially more profitable business to be lost.

Another prime required that two subcontractors file their claims within 30 days, while the prime needed only to assert a claim within 30 days. Although we found that seven subcontractors had changes clauses more restrictive than those included in the prime contracts, only one of these companies said it would not agree to the same type of clause again.

5. Options

Three of the four prime contracts studied contained option clauses giving the Government the right to increase the size of its orders unilaterally. Two of these contracts had cost-reimbursement options, whereby cost and fee targets would be adjusted if the options were exercised. The third had options that, if exercised, would allow the Government to buy units at prices not to exceed a specified ceiling. In each case, there were definite time and quantity limits within which the options could be exercised. According to a recent DoD directive,[4] fixed-price and ceiling-price options for high quantity production should not be used in development contracts except for limited production quantities to support operational test and evaluation.

[4]DoD Directive 5000.2 "Major System Acquisition Process" (IV) (F) (9), January 18, 1977.

The prime contractor with the ceiling price options passed down the same provisions to subcontractors. There were provisions in the prime contract and the subcontracts for economic price adjustments to reduce the risk of cost increases associated with inflation. There were no other clauses to protect the contractors if actual costs were greater than the adjusted ceiling prices.

The other two prime contractors reportedly did not make a practice of giving subcontractors options under fixed-price contracts. However, two subcontracts awarded by these primes were found to have fixed-price-type options. Neither had economic price adjustment clauses to reduce the effect of inflation.

When interviewed, one of these subcontractors said that his company incurred losses from that option clause and would not accept it in future contracts. The other worked for a prime that did not exercise its options.

6. Acceptance, Inspection, and Correction of Defects

The Government includes in prime contracts the right to inspect both the product it is buying and the seller's facility during the production phase and at the time of final acceptance. The Government also insists that the primes reserve the Government's right to conduct similar inspections at the subcontractors' plants. Each of the subcontracts studied provided that the Government would have the right to perform such inspections.

The Government also requires that any deficiencies found within six months of acceptance will be corrected to its satisfaction; or at its option, the defective units may be purchased at a reduced price. All four primes accepted the standard Inspection and Correction of Defects clause (ASPR 7-402.5(a)) or language based on it. They in turn required the subcontractors to accept a clause that called for the correction of defects within the scope of their warranty clauses.

Several subcontractors agreed to provide the same warranty to the primes as the primes gave the Government. In most cases, however, a subcontractor's warranty was to be in effect for 12 to 24 months. Prime contractors want a long-term warranty from

subcontractors so that it carries over into the six-month period after the prime delivers a finished product to the Government. The time between the prime's acceptance of a subsystem and the delivery of the completed system may be extensive. Several contractors had no time limit on their obligation to perform repairs, thus creating room for disputes and costly litigation.

The seven companies with FFP subcontracts incurred the greatest risk associated with the correction of defects, because such work would be performed at their expense. The companies with cost-reimbursement-type contracts would be reimbursed for carrying out corrections. Even though no profit would be included, the risk of the warranty was greatly reduced.

7. Deliveries

All the primes and subcontractors had firm delivery schedules they were required to meet. Failure to deliver on schedule would make them subject to charges of non-compliance and the contract could be terminated for default. In one instance, the Government added a clause giving it the right to reduce fees for late deliveries, and the prime passed this clause down to several of its subcontractors. However, in no instance was a substantial amount of money involved, relative to the size of the total fee.

All the prime contracts included an Excusable Delays clause (ASPR 7-203.11) that excuses performance delays due to causes beyond the contractor's control. All but one of the subcontractors also had the ASPR Excusable Delays clause or some other provision based on it.

8. Terminations

The Government included in the four CPIF prime contracts the right to terminate for default or its own convenience. The termination clause applicable to cost-reimbursement-type contracts is DAR 7-203.10. It covers termination for both default and convenience.

The DAR also contains two suggested termination clauses for use in subcontracts. DAR 8-703 is suggested for cost-reimbursement-type subcontracts and is applicable to termination for convenience or default. DAR 8-706 is suggested for fixed-price-type subcontracts and applies to termination for convenience. There is no suggested clause for the default termination of a fixed-price subcontractor.

The DAR termination clauses are listed by type of contract in Table 5.

TABLE 5. DAR TERMINATION CLAUSES

DAR Section	Contractor	Contract Type	Type of Termination
7-203.10	Primes	Cost-Reimbursement	Default and Convenience
8-703	Sub-contractors	Cost-Reimbursement Subcontracts	Default and Convenience
8-706	Sub-contractors	Fixed-Price Subcontracts	Convenience

All four prime contractors had CPIF contracts with the ASPR (DAR) 7-203.10 termination clause. The subcontractors had fixed-price or cost-reimbursement contracts, all of which contained termination provisions that referenced ASPR or were similarly worded.

It was observed, however, that the ASPR references did not necessarily correspond to the clauses suggested for the subcontract type in question. Of the 11 cost-reimbursement subcontracts, 3 had termination clauses that either applied to prime contracts or fixed-price subcontracts.

The suggested ASPR clauses for termination of cost-reimbursement prime subcontracts have similar provisions and are applicable to terminations for default and convenience. In the case of fixed-price subcontracts, the suggested ASPR clause that applies to terminations for convenience is also similarly worded. However, this clause

gives a prime contractor a significant advantage over subcontractors.[5] ASPR 8-706 permits the prime to terminate a subcontractor unilaterally and to make a unilateral decision about the amount due the subcontractor if the two parties cannot agree on a settlement. Although this is the same right the Government has when terminating the prime, the prime can appeal such a decision under the Disputes clause. The subcontractor does not have a similar course of action short of litigation. ASPR 8-706 also gives the prime the right to examine the subcontractor's books. Despite the shortcomings of the clause, subcontractors did not report having difficulties as a result of it.

9. Subcontractor Appeals

Section XXIII of the DAR, which sets forth the Government subcontract review process, prohibits a Government contracting officer from consenting to any clause giving the subcontractor the right to appeal directly to the Armed Services Board of Contract Appeals (ASBCA). The logic behind this is that the Government hires the prime, and the prime hires the subcontractors. No subcontractor works directly for the Government, therefore, no privity of contract exists between the Government and a subcontractor.

A prime may go to the board on behalf of itself and its subcontractors. However, primes are generally reluctant to agree to represent subcontractors in appeals to the Government, reportedly because it increases their risk. Consequently, only one subcontractor received a commitment from the prime to present its claim to the Government. None of the subcontracts had provisions for direct subcontractor appeal.

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[5] Norman Singer, Donald Gavin, and Allan Goodman, "A Critical Analysis of the Government's Subcontractor Termination Clause: ASPR 8-706, In the Light of Day," National Contract Management Quarterly Journal, 2nd Quarter, 1978.

4. FINDINGS —THE SUBCONTRACTING PROCESS

The four prime contractors were interviewed about their general subcontracting policies and about their dealings with selected subcontractors. Eighteen subcontractors were also interviewed about their dealings with specific primes and with primes in general. Both sets of interviews covered basically the same subjects: solicitation and selection, bidding, pricing and negotiation of contract type and clauses, and Government involvement in subcontracting. In addition, we asked the subcontractors' for their opinions about subcontracting. First, however, we asked the primes about the make-or-buy decision process.

A. MAKE-OR-BUY PROCESS

Prime contractors are required to follow a make-or-buy policy that conforms to criteria specified in ASPR 3-902. The make-or-buy procedure is used to decide which components of a major system will be made "in-house" and which will be purchased elsewhere. The four prime contractors went through this decision process prior to submitting their original proposals to the Government, and two of them generally repeated the process in the research and development (R&D) phase.

The following factors are considered by one or more of the companies interviewed when deciding whether to make or buy:

- Is the work something normally performed "in-house"?
- Does the work utilize "in-house" technology?
- Is the work compatible with other "in-house" operations?
- What resources are needed to perform the work "in-house"?
- Is there adequate capacity?
- Is it more efficient to perform the work "in-house" or subcontract it, considering the impact on costs, quality, and schedules?
- Is there a qualified source that can do the work?
- Can the work be performed by small or minority business?

The primes were asked for the chief factors that prompted them to subcontract. All four said that most subcontracting occurred when the required subsystems were outside their normal scope of activity. Other key factors were: limited capacity, a desire to limit capital expenditures, unwillingness to disrupt other product lines, and a desire to perform efficiently.

B. SOLICITATION AND SELECTION

After deciding which products or services are likely to be subcontracted, the primes solicit potential suppliers. Prior to solicitation, however, the primes list potential suppliers for each of the purchase items. This bidder's list is used as a guide in sending out solicitations. According to the primes, a bidder's list includes companies that:

- are recommended by the prime's engineers
- have with an established reputation
- have previously performed well for the prime
- that solicit the prime.

Each of the primes reported having a stated policy in lining up subcontractors. Two solicit bids from at least three companies. Another prime solicits bids from a minimum of two companies and usually gets responses from three bidders. The fourth prime generally sends notices to all potential suppliers then meets with all companies expressing interest. Those companies still interested after the meetings receive requests for proposals (RFPs) or requests for quotations (RFQs). While this prime established contact prior to sending out RFPs and RFQs, the other primes said their initial contact generally was through formal requests.

From the subcontractors' point of view, involvement in a program begins either when a prime solicits potential subcontractors, or when subcontractors contact a prime to inform him of their companies' capabilities. Of the 18 subcontractors questioned, nine said that they initially contacted the primes. These companies keep abreast of potential

business opportunities through industry periodicals, industry word-of-mouth, and, to a lesser extent, prime contractor personnel.

Eight other subcontractors reported that the primes solicited them to become involved in one of the four major programs covered in this study. In seven cases the primes accomplished this with RFPs or RFQs. We found that primes generally used either informal direct contact, formal requests, or a combination of both to solicit subcontractors. One-third of the subcontractors reported that they were usually contacted informally and then received formal requests for bids or quotes. The others normally were approached by only one of these methods during each solicitation.

Three primes brought the subcontractors into the program either prior to, or shortly after, award of the R&D contract. Although one prime said his practice was to line up subcontractors in the full-scale development phase, the subcontractors studied came into the program prior to award of the R&D contract.

We found that 13 of the subcontractors became involved prior to the Government's award of the R&D prime contracts. Evidently, these companies usually entered a program at this phase. One reason for this is that the primes need their technical input. Eleven of the subcontractors said they contributed to the primes' proposals and this was their standard practice. Several others were involved to the extent that their cost data, given to the primes during subcontractor competition, were included in the primes' proposals.

The primes were asked to rank the factors they emphasized when soliciting and selecting subcontractors. All four ranked technical capability first, because all other factors are irrelevant if a subcontractor does not appear able to do the work. Cost considerations ranked second, and overall managerial skills ranked third. The primes said they also considered relevant experience and previous dealings with the subcontractors, but these factors were less important than the other three.

We also asked the primes specifically about the selection of the 18 subcontractors in this study. Nine were selected in a cost-competition process, but they were selected

primarily because of technical superiority. Seven others were judged technically capable, but were selected on the basis of cost. Two subcontractors were selected because they were sole-source suppliers. These responses are consistent with the prime contractors' statements that they generally rate technical capability first and cost second during the solicitation and selection phases.

The primes try to avoid subcontracting with companies that may be financially incapable of performing the work. This normally means an analysis of the companies' financial statements by the prime or by the Defense Contract Audit Agency (DCAA); a Dunn and Bradstreet check on the financial strength of small companies; and interviews with lenders. One prime also surveys companies responding to its RFPs and RFQs to examine facilities, equipment, workforce, and management.

We asked the subcontractors how they rated their chances of winning and what factors they thought the primes emphasized in selecting them. The companies evaluated their own chances of winning, first on technical capability, next on relevant experience, then on cost, and finally on relationships with the primes. The subcontractors also listed these factors in the same order when asked to predict the primes selection criteria. However, when asked to list the factors that primes generally emphasize, without limiting themselves to the programs in this study, the subcontractors listed technical capability first and cost second, well ahead of the other choices. This coincided with the responses of the prime contractors.

At the time of competition, 7 of the subcontractors thought they had an even chance of winning, and 11 were optimistic. Most subcontractors told us that they did not compete unless they believed they had at least an even chance of being selected.

C. BIDDING

During the competitive phase, all the subcontractors thought they were bidding against other companies. In retrospect, three believed they were the only companies

to submit bids and would now classify themselves as sole-source selections. According to interviews with the prime contractors, two subcontractors were sole-source selections.

When asked about multiple rounds of bids, the primes reported that during the subcontractor selection process, they commonly initiated a new round of bids whenever there was a change in the technical package. Although multiple rounds of offers were employed, the primes denied they used the multiple best and final offers technique in an effort to lower prices. One prime explained that multiple best and final offers were not as effective a tool at the subcontractor level as they were when directed at prime contractors, because the subcontractors had a narrower scope of work and therefore fewer areas in which to cut costs. In addition, he stated that subcontractors came into the competition with low prices so that they would not be dropped at the outset.

In an effort to investigate the existence of auctioneering, we asked the subcontractors if the primes asked for best and final offers on more than one occasion. Eleven companies submitted best and finals. Two were asked to do so more than once, but both times they were also asked to change the scope of the work, not just the price.

The use of technical leveling was discussed with two primes, and both denied it occurred. Technical leveling was described as the distribution of a company's technical data to its competitors by the prime. When we asked the subcontractors who had submitted multiple bids if the primes gave them information about competitors' bids between rounds, all said no. This finding helps support the primes' claims that they do not use technical leveling. However, 11 subcontractors did report that there were clarifications or changes in the scope of work between bids.

In the original proposals, 13 subcontractors gave firm bids, and 5 provided budgetary offers. In no case was the bid price the contract price. The major reasons for the changes reportedly were price negotiations and changes in the scope of the work.

Sometimes, when bidding on work, a prime will team with one or more subcontractors. The four primes said they team up only occasionally. A company is asked to join a team only when it has the experience to do the job and a good reputation that will increase the prime's chances of winning the competition. Primes can be hurt by teaming up with a company that is unpopular with the Government. Teaming may also hurt the subcontractor, because he may be cut out of the program if another prime wins.

D. PRICING AND NEGOTIATIONS

Prime contractors usually have their engineers perform a cost analysis for each of the major subsystems that will be procured. This is done to help evaluate the bids. The primes said they did not discuss their cost estimates with potential subcontractors until they were in negotiations and the prime had received a bid. Subcontractors reported that primes did not make widespread use of "take it or leave it" prices. However, in negotiations a prime will sometimes quote the maximum price it is willing to pay and will then ask the potential subcontractor what changes can be made to keep a product's cost below the stated price.

1. Pricing

We asked subcontractors if, in pricing their bids, they considered: follow-on work, sales of spare parts, the value of the work experience, and the cost risk. With the exception of spare parts sales, each of these factors did affect the pricing decisions of most of the companies. Five companies said that cost risk was not a major factor. This may be explained by the fact that all five had cost-reimbursement contracts.

We asked the primes if, after reviewing what occurred in the development stage, they thought any of the 18 subcontractors attempted to "buy in". ("Buy ins" were defined as below-cost bids made with the intention of preventing losses through changes or in follow-on contracts.) The primes said that although they discouraged buying in because it could hurt them in the long run, it did happen. However, they also reported that none of the subcontractors included in this study attempted to buy in.

2. Terms and Conditions

In addition to price, terms and conditions are of major importance during negotiations. We asked the primes to comment on the extent each was willing to negotiate on contract clauses. All of them said that clauses required by the Government were not negotiable. One prime also said that the major clauses in its standard contract were not negotiable, but that exceptions had been made in warranty and reliability clauses. The other primes were more willing to negotiate across the board on contract terms and conditions. Besides contract type, the primes considered data rights and progress payments most important to subcontractors.

Only four of the subcontractors said they agreed to the contract as proposed by the primes. Thirteen claimed that some of the primes' terms and conditions were unacceptable. The major areas challenged were: patent rights, scope of work, warranties, and deliveries.

Most subcontractors indicated that they would agree to the same terms and conditions if they had the opportunity to renegotiate. The companies that were dissatisfied with their existing contracts listed as their chief problems: contract type, the lack of or improper economic price adjustment provisions, changes clauses, warranties, and options. Although there may have been problems, the subcontractors reported no disputes between themselves and the primes resulting in arbitration or litigation. In a related question, the subcontractors stated that none of the primes attempted to use verbal terms and conditions.

3. Contract Type

We asked the primes what types of contracts they awarded for development work and what factors were considered in the choice of contract type. The primes reported that they generally awarded a mix of cost-reimbursement and fixed-price-type contracts.

The type of contract selected reportedly is based on an analysis of the subcontractor's risk. This, risk as assessed by the primes, is affected by the scope of the

work, how clearly the work can be defined, and the number of changes anticipated. Several primes also listed the subcontractor's bargaining position as a factor in settling on contract type.

Eleven of the subcontractors had cost-reimbursement-type contracts, and most of these companies believed that the award of cost-reimbursement-type contracts was consistent with industry practice for the development work they performed. Similarly, of the seven subcontractors with fixed-price contracts, six thought it was the typical contract awarded for efforts similar to theirs.

The subcontractors with FFP contracts were asked why they agreed to that type of contract. Based on their replies, pressure from the primes was the major reason for accepting FFP business.

One company with an FFP contract thought that a CPIF contract would have been the typical contract awarded for its product. This subcontractor asked for a CPIF contract in its original proposal, but the prime had stipulated, in its instructions to the bidders, that the work would be done under an FFP contract and declared the proposal to be nonresponsive. The subcontractor wanted the business, so it ultimately submitted an FFP proposal.

Apparently, it is unusual for a company to propose a contract type different from what the prime puts in its instructions. Most companies are afraid of being declared nonresponsive and losing the competition. Aside from the potential loss of business, the great expense of preparing a proposal makes this a risky action.

The primes also stated that the selection of contract type was affected by the preference of some subcontractors for fixed-price-type contracts. This statement was supported by two subcontractors who said that they wanted fixed-price-type contracts and that all their business was conducted by that means. They said that they might suffer an occasional loss but that in the long run such contracts would be profitable. These

two companies and two others believed that the potential profits justified the risk of their FFP contracts. One subcontractor with a CPIF contract said that FFP contracts were sometimes preferred because there was less Government interference in administering and managing these contracts, and a greater chance to earn a reasonable level of profits.

Normally, the primes give FFP contracts when they can justify doing so. However, all the primes agreed that it was unwise to give a subcontractor a contract that exposed it to a significant loss; it resulted in deviations in performance; and made for difficulties in dealing with the subcontractor.

We asked the primes if, at the time of the interview, they were familiar enough with the product technology of the 18 subcontractors to evaluate their risk and the associated profit. Only once did a prime express uncertainty about a subcontractor's risk. The primes claimed that in all cases potential profits and risks were properly balanced. The one subcontractor whose risk was very uncertain was given a cost-reimbursement-type contract to replace the fixed-price-type contract originally agreed to. This change was accompanied by a change in the scope of work. There were lesser changes in eight of the other contracts. One had a substantial change in the scope of work, with a corresponding change in the price. The seven others had minor changes in the scope of work, also accompanied by price changes.

4. Subcontractor Performance

Reportedly, problems and strained relationships between the primes and subcontractors due to the contract type or clauses occurred in only 2 of the 18 contracts. The problems were minor to the primes, but in one case the prime was sure the subcontractor had major difficulties in performing as required. The primes claimed that none of these problems resulted in formal disputes.

The primes reported that it is their standard practice to place an engineering or management team at some subcontractors' facilities to help avoid potential

This normally is done when a subcontractor is supplying a complex item that requires a close interface between the prime and subcontractor, or when the prime is providing inputs into the subcontractor's effort, or when the subcontract is a costly program that will impact heavily on the prime. Other than in these situations, a prime will sometimes place a management team at a subcontractor's facility if the subcontractor is having problems in performing. The primes reported that they had teams at the facilities of seven subcontractors as a standard practice, and not because of performance difficulties. One prime did report that a subcontractor was having major problems in meeting his contractual obligations. Unfortunately we could not include that subcontractor in our study, because it would have interfered with the efforts of the prime's management team established at the subcontractor's facility just prior to our interviews.

E. GOVERNMENT INVOLVEMENT IN SUBCONTRACTING

It is thought that many subcontractors also act as prime contractors in defense-related programs. Fifteen of the eighteen subcontractors studied had been or were also primes. Only three companies operate strictly as subcontractors in defense-related programs. Initially we believed that this dual role would affect the companies' responses about Government involvement in subcontracting. To test for this, we separated subcontractors' opinions according to the level of prime work each performed. Because we found no meaningful differences among the groups, we have treated subcontractors as a single group when presenting their responses to our questions.

1. Flow-down of Required Contract Provisions

We asked the subcontractors to comment on the impact of Government provisions that the prime contractors are required to flow-down to them. Most subcontractors said that they had adjusted to the Government's way of doing business and had no major problems in dealing with these provisions. However, several companies did cite the required use of a Government-approved cost control system as an annoyance.

They claimed the Government's criteria make the system more costly and do not improve the management of a program.

In related questions, we asked the subcontractors about the effect of the following Government provisions: product inspection, status reporting, cost and pricing data, cost accounting standards, and auditing. The general comments on each of these topics were very similar to the responses to the previous question. The subcontractors said they no longer had major problems in these areas. However, several companies did claim that the cost accounting standards were unreasonable and costly to adhere to. In addition, some complained that Government inspections sometimes delayed the orderly work process if they needed to be performed at any time other than during normal Government working hours.

We asked the primes and subcontractors to comment on the socioeconomic provisions that the Government imposes on them. All the companies said their contracts had socioeconomic clauses, and, in all cases, the Government surveyed them to assure they were in proper compliance. Most subcontractors thought that the primes checked on them through the Government. This agrees with the primes' statements about the methods they use to assure that the subcontractors meet required socioeconomic objectives. The primes stated that some subcontractors had minor problems meeting the requirements, but they had been corrected. Most of the subcontractors thought that existing regulation in this area was sufficient. Some also expressed the opinion that socioeconomic programs reduced efficiency and increased costs.

2. Flow-down of Beneficial Contract Provisions

The primes were asked if they had been willing to pass on to the subcontractors some of the beneficial provisions that the Government included in the prime contracts even when not required to do so. All said yes. One prime reported giving subcontractors award fee provisions when the Government gave him such a provision. This

prime did flow-down award fee provisions in the subcontracts reviewed in this study. However, as reported in the previous section, two other primes did not pass on award fee provisions. Several primes said that progress payments were given to subcontractors although there was no requirement to do so; and we found this to be a common practice in all of the programs we examined. One prime claimed to give the subcontractors better sharing ratios than it got from the Government. We could not substantiate this claim, but we did find that the prime had given its subcontractors the same sharing ratio it had with the Government.

We asked the primes what the effect on their program would be if they were required to pass on to their subcontractors the favorable provisions of their contracts with the Government. Three said they would lose the management control they needed to run the programs effectively. The fourth claimed that the flow-down of favorable provisions was good business policy and he did so when possible. A comparison of his contract with the Government and those he had with the subcontractors showed that he did flow-down all major provisions except the award fee.

We also asked subcontractors if the primes should be required to pass on to them the beneficial provisions of the prime contract. Fourteen companies said yes. Eleven expressed the opinion that contract type should flow-down when the subcontractors have sufficient risk to justify such an action. This factor was of major importance to the respondents. Other provisions that subcontractors desired were progress payments and award fees. Most companies said they were having no difficulty receiving progress payments from the primes, but their contracts seldom had award fee provisions. One subcontractor who complained of this noted a situation where it had provided designs that earned the prime a substantial award fee, but the prime did not pass any of that fee back to the subcontractor.

Four subcontractors, all with cost-reimbursement-type contracts, stated that they did not think the primes should be required to flow-down beneficial provisions of their contracts. All of these companies had strong bargaining positions and preferred to deal directly with the primes, without Government involvement.

3. Direct Dealings Between the Government and Subsystem Suppliers

The primes and subcontractors were also asked if the Government and the subcontractors should be able to bypass the primes and deal directly with each other during the development phase of a program. All the primes said no. They said that the prime was hired as a program manager and that failure to involve him in a decision reduced efficiency and increased confusion, engineering and quality problems, delays, and ultimately costs. Most subcontractors also said they did not favor dealing directly with the Government. They felt that this would disrupt their communication with the primes and increase the probability of conflicting orders that would reduce efficiency. Some subcontractors agreed that if the prime was the manager he should be allowed to run the program without interference. Others thought it was unwise to deal directly with the Government because of the possibility of being caught in a disagreement between the prime and the Government and jeopardizing future business with both.

A related question focused on the practice of having subcontractors supply their products to an assembler as Government-furnished equipment (GFE) after the development program is completed. The primes agreed they would not want this to happen in one of their programs. They doubted the Government could perform the supplier coordination role as well as private industry. The primes claim they incur greater administrative costs in GFE programs and pass most of them on to the Government. At the same time, the Government incurs greater administrative costs, because it takes over some of the functions of the prime, less efficiently. It was thought that these increases may offset any anticipated savings.

About half of the subcontractors also preferred that the Government not act as a supply coordinator. Several thought their business would be hurt if the primes were not responsible for acquiring subsystems; they feared the primes would react by keeping much of the work "in-house". Some subcontractors prefer to deal with primes because they reportedly are better managers and integrators, and generally more cooperative at the working level.

Other subcontractors thought that the Government could save money by taking over some of the primes' responsibilities, provided that established and relatively simple products were selected. These comments were in agreement with a thought expressed by one of the prime contractors that Government management could be successful on a limited basis if the programs did not involve numerous changes.

4. Recompeting at the Subcontractor Level

A subcontractor's ability to continue selling its product throughout the life of a program may be disrupted if he is required to recompete for the business. Six subcontractors said that recompeting made companies keep tighter controls on costs. Three of these respondents qualified their support by stating that recompeting should be limited to long production runs where the cost of additional tooling could be offset by the savings from lower prices. Many companies said that if they did win a contract from a competitor, they would find it difficult to utilize the other company's special tooling and probably would not operate it as efficiently. In some cases, they would require that new tooling be provided.

Eleven of the subcontractors claimed recompeting was unwise. Some thought it was unfair to the companies that accepted the risks associated with the development work, particularly if it were performed under a fixed-price-type contract. Other subcontractors said that unless a supplier had let his price get out of line or was otherwise doing a bad job, it would be unwise to bid against him. The existing subcontractor knows the product, the processes, the tooling, and any attendant problems, and its bid will

reflect this knowledge. A competitor ignorant of the problems may bid too low and be in a position to incur a loss. Then the Government may have to decide whether to bail out the subcontractor or lose time while a new competitive selection is conducted and a new source starts production.

F. SUBCONTRACTORS' PERSPECTIVES

The final series of questions was directed at the subcontractors only and was designed to gather specific information about each one and the subsystems they contribute to the four major weapon systems studied.

Eleven of the subcontractors said they had continuing relationships with the primes. This agrees with the primes' statements that successful dealings on prior programs are an important factor in subcontractor selection.

In 10 cases, we found the primes were not the major buyers of the subcontractors' products. For 16 of the 18 subcontractors surveyed, only 4 of the subsystems included in this study would have taken up more than 25 percent of capacity during the production phase. Many subcontractors said they did not want any single program to take up a large percent of existing capacity, because cancellation could jeopardize the entire company. They believe one of the advantages of being a subcontractor is the ability to minimize risk by spreading business among a number of programs.

As mentioned earlier, many subcontractors are also primes. Of the 18 subcontractors participating in this study, 7 conducted more business as primes than as subcontractors, 7 others did more business as subcontractors than as primes, and 4 either could not estimate the split or thought it was even. Because so many companies have both types of business, we asked them to list the advantages of being a subcontractor versus those of being a prime.

The most often cited advantage of being a subcontractor was the reduction of risk by spreading it over a number of programs. Also mentioned frequently was the

ability of the subcontractor to avoid much of the cost and "red tape" involved in dealing directly with the Government. In addition, several companies said they could operate more efficiently as subcontractors rather than as primes.

As viewed by the same 18 companies, the major advantage of operating as a prime contractor was the power of managerial control. When a company is the prime contractor, it decides what work will be performed "in-house" and what will be subcontracted out. Reportedly, a prime contractor is also in a better position to get the proper contract type and equitable terms and conditions. As perceived by these companies, the primes are able to reduce risk by becoming involved in a major program. Unlike the subcontractor, the prime is much less likely to be replaced in a major program.

5. CONCLUSIONS AND RECOMMENDATIONS

Analysis of our findings indicates that prime contractors use subcontractors to obtain technology that is not readily available or would be more costly to employ within their own companies. This is done through competition, with the objective of buying quality subsystems at minimum prices. Our overall assessment of the precepts and practices of the prime contractors involved in this study is that they support the successful operation of the subcontracting process as it relates to major systems acquisitions. We found that prime contractors' subcontracting practices are basically consistent with DoD regulations, and the relationship between prime contractors and their subcontractors is generally satisfactory. Although the sample is small and limits our ability to generalize, it should be large enough to identify any widespread problems.

At times the fixed-price-type of contracts and certain terms and conditions have occasionally strained relations between primes and subcontractors, but neither group has expressed significant dissatisfaction with the existing process. Both primes and subcontractors prefer to conduct their business with little Government intervention, and an expanded Government management role may not be cost effective. Therefore, recommendations are offered only to correct a few specific problems.

Prime contractors' make-or-buy policies conform to the Government's criteria. When soliciting subcontractors, they seek adequate competition and avoid sole-source suppliers whenever possible. Adequate competition does exist, as evidenced by the number of subcontractors' seeking business from the primes, and by the subcontractors' unanimous initial response that they had been selected competitively.

We have concluded that the primes seek reliable, capable subcontractors who are also price-competitive. They check the reasonableness of bids against their own estimates of what the subsystems should cost to develop. Although the primes seek low prices, as a rule they do not conduct auctioneering or technical leveling. They discourage buying in and do not contract with companies financially incapable of handling the work.

Primes try to match their estimate of a subcontractor's risk with the type of contract awarded. However, they are not always successful, and they occasionally subject subcontractors to high risks. Some subcontractors that work primarily under FFP contracts have incurred losses. Although most of them would prefer to work under the same type of contract the primes have, they are willing to accept the risk of the FFP contract, because they want the business, and, to a lesser extent, because they want to avoid red tape and interference from outsiders. Subcontractors that do receive CPIF contracts also get fees and cost-sharing ratios that are in line with what the Government gives the primes.

Recommendation: The DoD should continue to use the Contractor Procurement System Review Program to monitor the selection of contract type, particularly in the case of high-risk subsystems.

The primes flow-down the required contract terms and conditions. Most of the primes also flow-down some beneficial provisions even when not required to do so. The most common is the use of progress payments. Some primes also give subcontractors provisions for award fees, but this does not appear to be a widespread practice. The use of award fees at the subcontractor level does not create risk for the primes, but it may result in lower fees by increasing allowable costs.

The greatest amount of risk in development subcontracts occurs in the use of FFP options. These can be onerous to a subcontractor, especially if there are no provisions for economic price adjustments. If economic price adjustments were employed, they would likely remove much of the risk and would result in more realistic price quotes. If the primes follow the DoD's lead in discouraging FFP and ceiling price options, this will cease to be a major problem.

Recommendation: The DAR should specify that development subcontracts with FFP or ceiling price options for long-term or large quantity buys be accompanied by provisions for economic price adjustments.