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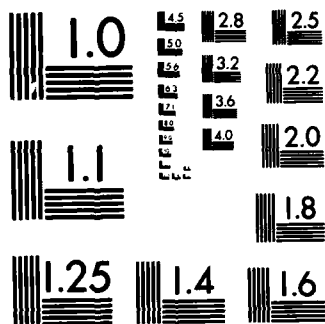
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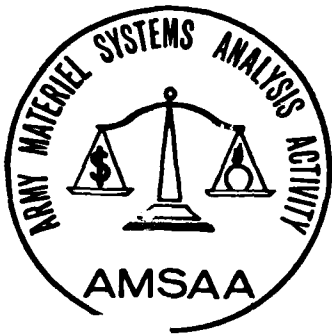
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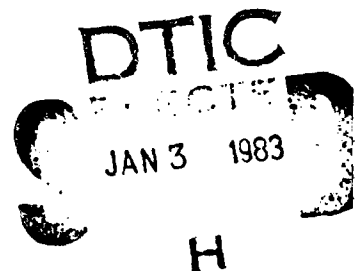
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FINAL

SUBCONTRACT COMPETITION

NOVEMBER 1982



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A copy of subject report is inclosed for your use. This study focuses primarily on the possibility of increasing the level of subcontract competition. Data are provided in the report to indicate current levels of subcontract competition based on samples of Contractor Purchasing System Review reports and analysis of twelve major and large dollar value systems representing each of the military services. The level of subcontract competition can be increased; however, existing constraints must be identified and relaxed, and funds and time must be planned and programmed early in the development cycle to generate new sources and test their products.

FOR THE DIRECTOR:

1 Incl
as

William B. Williams
for PAUL F. ARVIS, Ph.D.
Manager, US Army
Procurement Research Office

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FINAL

SUBCONTRACT COMPETITION

by

Wayne V. Zabel

Charles A. Correia

The pronouns "he," "his," and "him," when used in this publication, represent both the masculine and feminine genders unless otherwise specifically stated.

Information and data contained in this document are based on input available at time of preparation. Because the results may be subject to change, this document should not be construed to represent the official position of the US Army.

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US Army Procurement Research Office
US Army Materiel Systems Analysis Activity
Fort Lee, Virginia 23801

EXECUTIVE SUMMARY

A. BACKGROUND/PROBLEM. It is generally accepted that competitive forces in a free enterprise marketplace produce many benefits, including technical innovation, improved performance, and price reduction. Recognizing the benefits of competition, Government policy is that acquisitions shall be accomplished on a competitive basis to the maximum extent practicable. Although an abundance of knowledge exists about the extent of competition at the prime contract level, equivalent knowledge for subcontract competition does not exist. Since a substantial portion of Defense procurement funds are redistributed at the subcontract level, subcontract competition should be investigated with a goal of improving the acquisition process where possible.

B. OBJECTIVE. The objective of this study was to determine the feasibility of increasing the extent of competition in defense subcontracting.

C. STUDY APPROACH. Research began with a review of literature and current policy to gain insights on competition at the subcontract level. Contractor Purchasing System Review (CPSR) data was analyzed to determine the general extent of subcontract competition throughout DOD, and selected major systems and large dollar value Army, Navy, and Air Force programs were examined to determine their specific extent of subcontract competition. Government Owned Contractor Operated (GOCO) ammunition plants were examined as a commodity group because of their large dollar value and availability of CPSR data. Contractor and Government representatives were interviewed to obtain the competition data and to gather insights into the constraints to increased subcontract competition.

D. CONCLUSIONS. A substantial portion of defense dollars are redistributed competitively under prime contracts which are themselves noncompetitive. CPSR data provides estimates of 42.94% and 78.93% competitive subcontract dollars for DOD contracts and GOCO's respectively. A review of 12 major systems showed a weighted average of 38% competitive subcontract dollars and a wide range of 3.9% to 92.3%. The extent of subcontract competition is a function of many opportunities and constraints, and the potential for subcontract competition can vary widely from system to system and from contract to contract. The level of subcontract competition can be increased; however, existing constraints must be identified and relaxed, and funds and time must be planned and programmed early in the development cycle to generate new sources and test their products. Because of varying degrees of competition potential and the uniqueness of each system or contract, a specific contract clause or goal for subcontract competition is not appropriate.



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CHAPTER I

INTRODUCTION

A. BACKGROUND/PROBLEM.

It is generally accepted that competitive forces in a free enterprise marketplace produce many benefits, including technical innovation, improved performance, and price reduction. The main exception to this general presumption of competitive efficiency stems from the presence of economies of scale. Generally some form of monopoly is the only practical way to capture the potential efficiencies in such areas as communication, transportation, electric power, oil and gas, and other industries in the United States. However, in such markets as these where competition cannot reasonably exist, Government regulation is generally exercised.

In economic theory, market situations range from pure competition (where in a general sense no individual buyers and sellers are large enough to influence the market) to monopoly (where basically one seller has so much control of the supply of a commodity as to be able to regulate its price.) The Government buyer, just as the private buyer, must acquire goods and services in a marketplace which exhibits various buyer/seller relationships and degrees of competition falling between the extremes of pure competition and monopoly.

Recognizing the benefits of competition, Government policy is that acquisition shall be accomplished on a competitive basis to the maximum extent practicable. The quest for competition begins with the basic legislation regulating Government acquisition, and is implemented in Defense acquisitions by the Defense Acquisition Regulation (DAR 1-300.1): "Competition. All procurement, whether by formal advertising or by

negotiation, shall be made on a competitive basis to the maximum practicable extent." Armed Services Procurement Regulation Manual (ASPM No. 1) defines competition as "an environment of varying dimensions relating to buy-sell relationships in which the buyer induces, stimulates, or relies on conditions in the marketplace that cause independent sellers to contend confidently for the award of a contract."

While the benefits obtained by competition can be significant, they are not to be gained without some cost or risk. This is true whether the marketplace is at the prime contract level or at the subcontract level. Although an abundance of knowledge exists about the extent of competition at the prime contract level because of numerous studies, Department of Defense (DOD) and Service initiatives, and published procurement statistics, the Competition Subgroup of the Acquisition Improvement Steering Group (AISG) has recognized that equivalent knowledge for subcontract competition does not exist. Since a substantial portion of Defense procurement funds are redistributed at the subcontract level, subcontract competition should be investigated with a goal of improving the acquisition process where possible.

B. OBJECTIVE.

The objective of this study was to determine the feasibility of increasing the extent of competition in defense subcontracting.

C. STUDY APPROACH.

The study approach to accomplish this objective began with a review of literature and current policy to gain insights on competition at the subcontract level. Existing procurement statistics, available data bases, and reports of Contractor Purchasing System Reviews (CPSR's) were examined to ascertain the current level of competition at the subcontract level for

representative defense contractors and contracts. This data provided insight into the general extent of subcontract competition throughout DOD. Selected major systems and large dollar value Army, Navy, and Air Force programs were examined to determine their specific extent of subcontract competition. Contractor and Government representatives involved in these selected programs were interviewed to obtain the competition data and to gather insights into the constraints to increased subcontract competition. From this investigation the feasibility of increasing the extent of subcontract competition was determined and recommendations were developed.

CHAPTER II

SUBCONTRACT COMPETITION DATA

A. INTRODUCTION.

To pursue the objective of increasing subcontract competition without knowing the current extent would be folly. It is first necessary to determine the extent of subcontract competition that currently prevails and the realities of the acquisition process that confront both DOD and industry acquisition managers.

This chapter presents data which was collected and analyzed to determine (1) the current extent of competition at the subcontract level and (2) the perceived constraints to increasing the existing level of competition. The literature survey identified relatively little previous work in the area of competition at the subcontract level compared with competition at the prime level. Subcontract data presented here was analyzed and organized into three categories: (1) "across the board" subcontract competition as evidenced by the Contractor Purchasing System Review (CPSR) Program; (2) subcontract competition levels in representative major systems and large dollar value Army, Navy, and Air Force programs; and (3) subcontract competition in the Army's Government Owned-Contractor Operated (GOCO) programs.

B. LITERATURE SURVEY.

1. Articles.

Of the numerous articles found under the general headings of "competition" and "subcontracting" few dealt specifically with competition at the subcontract level. Two of the articles that did were the Logistic Management Institute (LMI) studies of the early 1960's which predated the CPSR program. [1, 5] Three other studies included a master's thesis entitled "The Need to Increase

Competition at the Subcontract Level," December 1979, by LT David Alan Capizzi,[2]; a student paper entitled "Subcontract Policy, Competition, and the Industrial Base," May 1981, by MAJ Ronald T. Kadish,[7]; and an LMI contract study entitled "Subcontract Policy in Major Systems Acquisition," November 1978.[10]

Capizzi found in his study that the extent of competitive subcontracting is unknown and the need to increase competition cannot be determined without further research. He recommends that data be obtained by a reporting system and that a subcontracting clause be developed if more competition is desirable. Kadish's approach to subcontract competition was directed at the impact of prime contractors' goal motivated behavior. He argues that the Government must begin a comprehensive review of its present approach to subcontracting and develop a new subcontracting policy based on production competition. The LMI study, while primarily a study of subcontracting policy, did conclude, in part, that prime contractors seek adequate competition and avoid sole source suppliers whenever possible, and that adequate competition does exist. The LMI study, while more analytical and thorough than the student studies, was based on only four weapon system programs.

2. Other Literature Sources.

A large body of knowledge exists about competition in Government contracts. This is evidenced by DOD statistics on the extent of competition and by numerous studies, reports, and articles about its value, applications, successes, and failures. Yet, little if any attention has been given to competition at the subcontract level. Unfortunately, many critics of military procurement practices fail to consider that some portion of the noncompetitive prime contract dollars are

competitively awarded via subcontracts. As an example of this narrow viewpoint, one can look to Congress itself. On 29 June 1981 the Senate Government Affairs Committee held a hearing on S.2127. The Chairman opened the hearing with a prepared statement which criticized DOD for going from 34% competitive contracts in 1972 to 25% in 1980.[9] These statistics may be valid on the surface, but they do not reflect the value of subcontracts which were awarded competitively. Although the absolute amount of competitively awarded DOD dollars in any year is currently unknown, it should not be ignored or assumed to be zero. Had subcontract competition data been available, a more accurate statement could have been made regarding the percentage of DOD dollars spent competitively.

C. CONTRACTOR PURCHASING SYSTEM REVIEW (CPSR) DATA.

1. General.

DOD does not have a system for gathering statistics on subcontract competition to the extent that it does for prime contract competition. Yet, knowledge of the extent of subcontract competition should logically precede and become a partial basis for any decision as to the feasibility of increasing subcontract competition. While exact figures are unavailable, the CPSR program does provide data which can be used as an indication of the extent of subcontract competition in DOD wide acquisitions.

The CPSR process was incorporated into the Armed Services Procurement Regulation in 1966.[2] A major part of the review is whether a contractor competes his purchases and subcontracts to the maximum extent practicable. Detailed information concerning the applicability and mechanics of the CPSR program can be found in DAR 23 part 1, and DAR Supplement No. 1.[3]

2. Description of the CPSR Sample.

Fifty-eight out of 134 active CPSR's from the nine Defense Contract

Administration Services (DCAS) regions are included in the sample. The distribution ranges from a low of five in two regions to a high of nine in another. All CPSR's in the study sample are subsequent reviews performed to validate the adequacy of the contractor's purchasing system for fiscal years 1980 and 1981. The CPSR teams use a stratified random sample of the following dollar categories:

- \$10,000 to \$25,000
- \$25,000 to \$100,000
- over \$100,000

Usually, fifty subcontracts in each category are examined; however, if there are less than the minimum number of subcontracts over \$25,000, the CPSR team is advised to review all orders over \$25,000 issued during the past twelve months.

The fifty-eight CPSR's selected for this study totaled 4,691 awards reviewed for a total dollar value of \$524,626,000.

3. Presentation of CPSR Data.

Table 2.1 is a summary table of the extent of competition among subcontractors represented by the CPSR reports included in the study sample.

The CPSR data shows the extent of competition in subcontract awards is just over 50%. Using the sample size of 4,691, a 95% confidence interval, correct to within 1.43 percentage points, is given for the estimate of the percentage of competition in subcontracting as 50.69% to 53.55%.

Table 2.2 summarizes the 95% confidence intervals along with the degree of accuracy for the \$10,000 and over category.

When awards are not made competitively there must be a justification for single/sole source awards. Seven qualifications are listed for which

TABLE 2.1

ADEQUATE AND EFFECTIVE COMPETITION
FOR ALL REGIONS

	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	TOTAL
		Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000					
Awards Reviewed	968	407,958,000	1767	84,937,000	1956	31,731,000	4691	524,626,000			
Sample Awards Made Competitively	528	165,940,000	911	43,297,000	1006	16,055,000	2445	225,292,000			
Awarded Without Competition	440	243,220,000	856	41,541,000	950	15,624,000	2246	300,385,000			
Percentage of Sample Awards/ Dollars Made Competitively	54.54%	40.68%	51.56%	50.98%	51.43%	50.60%	52.12%	42.94%			

DEPTH OF COMPETITION

Competitive Awards	528	911	1006	2445
No. of Quotes Solicited	2140	3124	4086	8986
Responsive Quotes Received	1533	2460	2812	6794
*Average Depth of Competition	2.90	2.70	2.80	2.78

* = $\frac{\text{Responsive Quotes Received}}{\text{Competitive Awards}}$

TABLE 2.2

95% CONFIDENCE INTERVALS FOR PERCENTAGE OF COMPETITION IN SUBCONTRACTING

Sample Size	Over	\$ 25,000-	\$10,000-	Total
	\$100,000	\$100,000	\$25,000	
	968	1.767	1,956	4,691
Degree of Accuracy	3.15%	2.33%	2.22%	1.43%
Confidence Intervals	51.40 - 57.68	49.34 - 53.89	49.21 - 53.65	50.69 - 53.55

contractors may justify other than a competitive award. Table 2.3 lists the distribution by dollar category listing justification for single/sole source awards for all DCAS regions. It should be noted that the last column indicates the relatively low frequency of 1.54% inadequate justification for nonuse of competition.

Appendix A lists additional tables similar to those in this section for each of the nine DCAS regions.

D. SUBCONTRACT COMPETITION IN MAJOR SYSTEMS AND LARGE DOLLAR PROGRAMS.

1. General.

Data provided by CPSR reports provides an indication of the extent of competition in the defense industry in general. However, the CPSR is intended as a review of a purchasing system, not as a review of subcontracts awarded under a specific program or contract. Accordingly, the data contains a mix of military services, products, contractors, volume of business, etc. Data pertaining to competitive subcontractors on a specific contract or program is not required to be maintained and is generally unavailable. In order to ascertain the extent of subcontract competition on major systems and large dollar value noncompetitive programs it was necessary to assemble data from historical records on a case by case basis. Because of the time constraints imposed on this effort, only a limited number of systems could be analyzed. Data was developed for eight Army systems by the prime contractor, project office, procurement office, or contract administrative office. Field visits were made for each system to discuss both the data itself and to obtain perspectives concerning the constraints on competition. The Navy and the Air Force each provided data on two systems.

TABLE 2.3

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR ALL REGIONS

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	48	58	35	141
Engineer Directed	33	94	145	272
Proprietary Item	12	48	52	112
Only Supplier Qualified	201	356	338	895
Economically Justified (Tooling, qualification test, delivery, etc.)	73	189	237	499
Other Justifiable Reasons	71	120	135	326
Inadequate Justification	<u>4</u>	<u>13</u>	<u>18</u>	<u>35</u>
TOTALS	442	878	960	2280
				100.00

NOTE: Dollars not reported by all Regions.

2. Competition Data for Major Systems.

Table 2.4 provides a summary of the subcontract competition evidenced by the twelve systems analyzed in this study. While the column headings are self-explanatory, several general comments are in order:

- a. All percentage figures in this chart are based on unadjusted dollars;
- b. Purchased Material (P.M.) includes all categories of purchased parts, subcontracted items, and material;
- c. The total contract cost of each system represents the dollar cost in a specific contract, except in the case of the CVN-70. CVN-70 data spans the early seventies to 1982, and represents 12,173 purchase orders. Because CVN-70 data could not be retrieved via an automated means, only those purchase orders with a value of more than \$100,000 were reviewed, however, all such orders were reviewed thoroughly.
- d. Because the data was developed from an individual contract representing each system (except for the CVN-70) the table must be considered to represent a snapshot in time.

Table 2.4 might appear to indicate that helicopter programs are more competitive in subcontracting than fixed wing aircraft or tracked vehicles. This may be true for the six contracts reviewed in those commodity areas, but it can not be assumed that this would hold true if the systems were analyzed over their entire development and production time frames. Systems tend to be very competitive in subcontracting in the development phase and exhibit a decline in competition as competitively selected subcontractors evolve into single sources in the production phase. As the system is developed further, abandoning

TABLE 2.4

SUBCONTRACT COMPETITION IN SELECTED MAJOR SYSTEM AND LARGE DOLLAR PROGRAMS

<u>PURCHASED MATERIAL</u>					

¹FIREFINDER data reflects expected costs.²\$ not available.³Major sub controls 62% of contract material cost of which 19.1% is competitive.⁴Competition data based on sample of purchase orders.

a successful subcontractor becomes more difficult because of economic or time constraints. The systems in Table 2.4 are represented by contracts which are in various stages from development into production, and data for the next contract award could be quite different. For example, the next production contract on the M1 tank will break out the major subsystems and cause the 38.5% figure in the last column to increase dramatically. At the same time, competitive suppliers on the AHIP may become a single source on the production contract and cause a decrease in exhibited competition.

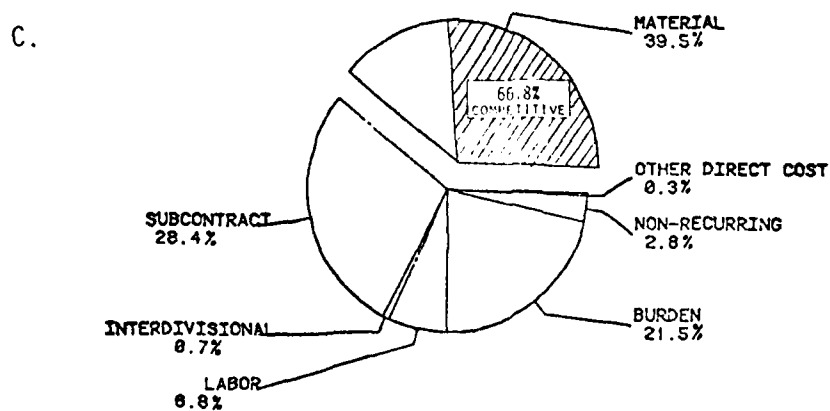
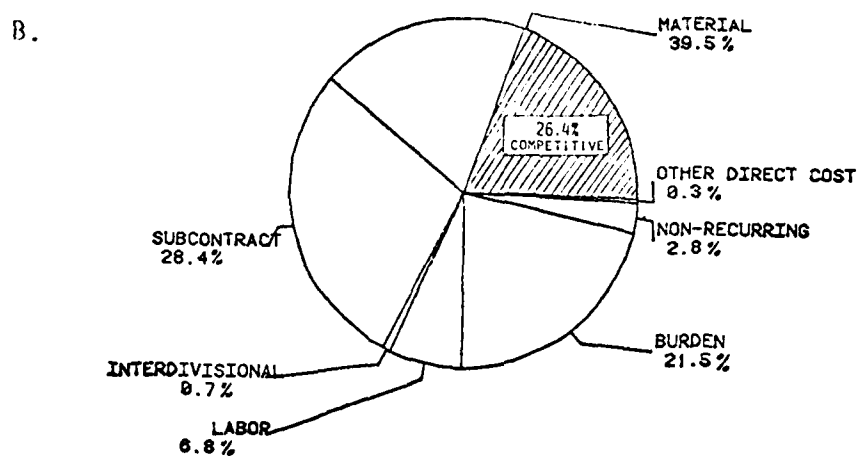
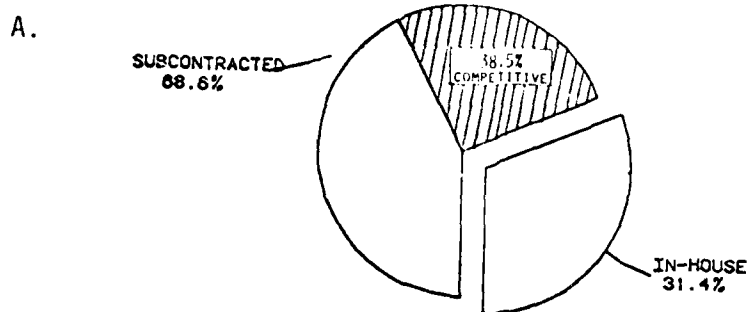
Competitive subcontract dollars awarded as a percentage of total dollars subcontracted exhibit a wide range of 3.9% to 92.3%. The weighted average is 38.0%. While a greater percentage of competition is obviously more desirable than a smaller percentage, the individual figures in Table 2.4 should not be considered either favorable or unfavorable. It might be theoretically possible that 3.9% is the most which can be achieved competitively in one instance while 92.3% is the least possible. GAO has recognized this distinction between noncompetitive--potential and noncompetitive--no potential for prime contracts.[6]

3. Baseline Choice Effects.

The last column in Table 2.4 shows competitive subcontracting as a percent of all purchased material on the particular prime contract reviewed. This figure corresponds to the percent of dollars awarded competitively in the CPSR data (Table 2.1) since the base for both percentages is total dollars of subcontracts awarded. The M1 tank will be used to illustrate how different approaches can provide very different results. The Senate Armed Services Committee staff requested a variety of data on three Army

systems, including the M1 tank, in February 1982. In addition to other data furnished, the percentage of first tier subcontracts awarded competitively in FY 80 and FY 81 was reported to Congress as being 2% for the M1 tank. Discussions with personnel at the Army Tank-Automotive Command (TACOM) confirmed that the base used to calculate that percentage of competition was the total program funding for each fiscal year. The 2% figure results from using total funding as a base; however, it would be improper to infer that all of the M1 funds are available for subcontract competition.

Using as a base just those dollars considered available for competition produces a considerably different result. Figure 2.1 illustrates this approach. M1 data is based on the third production contract and limited to the subcontracts awarded by the prime contractor with dollars obligated on that FY 81 contract. The analysis indicates that 68.6% of the funds (cost dollars) obligated on the contract were redistributed by the prime contractor in the form of purchase orders, subcontracts, and inter-divisional transfers. Of those funds 38.5% were competitive as shown in Part A. Part B shows this to represent 26.4% of the obligated amount of the contract. Further analysis indicated that 28.4% of the obligated cost of the contract (or 41.4% of the total dollars subcontracted) represents five major subsystems which are not susceptible to competition from a practical standpoint. TACOM personnel indicate that these subsystems will be broken out in the fourth production contract. Using available dollars as a baseline shows that the prime contractor really only had 40.2% (39.5 for material and 0.7 for interdivisional) of the contract cost susceptible to competition and, of that, 66.8% was competitive as illustrated in Part C. In this context, the feasibility of increasing subcontract competition is limited to the 13%



DISTRIBUTION OF SUBCONTRACT DOLLARS
M1 THIRD PRODUCTION CONTRACT
FIGURE 2.1

of the obligated dollars noncompetitively subcontracted for which the prime contractor has varying justification.

This M1 tank example illustrates how varied the picture of competition can be depending on the baseline chosen for reporting the information.

E. ARMY GOVERNMENT OWNED CONTRACTOR OPERATED (GOCO) AMMUNITION PLANTS.

The Army as the DOD single manager for ammunition is responsible for 26 GOCO ammunition plants. The 14 active plants, dependent on the type munitions they manufacture, either produce propellants and explosives and/or load, assemble and pack conventional ammunition. Since the Army provides most of the major components, e.g. projectile bodies, as Government Furnished Material (GFM), the subcontracts awarded by the prime contractor are for three general classes of materials. The prime buys semiprocessed materials such as chemical elements for mixing explosives or copper to clad bullets with; basic supplies such as wood, corrugated paper, and packaging tape for packing ammunition; and small components and parts not available in the DOD wholesale inventory. The types of items being bought at the GOCO's resemble those bought at the second or third tier subcontract level on a major weapon system.

Subcontract competition data on the GOCO's was collected for three reasons. First, the ammunition program with PAA funding of \$803.6 M in FY 81 constitutes a significant part of DOD's acquisition funding. Secondly, the GOCO's represent a collection of contractors working in a single commodity. While the operations each contractor performs will differ with the type of ammunition or explosive/propellant being manufactured, in the aggregate they are a single industry group. The third reason for using the GOCO's is that their purchasing systems are reviewed by the Army Armaments Materiel Readiness Command using the CPSR format. The CPSR's for ten

active plants reviewed during CY 81 covered subcontracts worth over \$250 M.

Table 2.5 displays the subcontract competition data for the ten plants in the sample. While the percentage of dollars awarded competitively is almost double that of the contractors reviewed by DCAS, 79% versus 43%, it should not be assumed that the contractors can achieve the same percentage. As already mentioned the subcontracts awarded by a GOCO have more of the characteristics of the lower tier subcontracts for a weapon system or the prime contractor's purchases of basic operating supplies. Generally, the degree of competition is enhanced as the requirement becomes simpler or it exhibits more commonality with private sector materiel usage.

In view of the type of materiel and services the GOCO's purchase, a higher level of competition would be expected than that encountered with high technology weapon systems. Therefore in determining a 95% confidence interval, correct within 3.66 percentage points, the percentage of subcontract competition was assumed to be at least 60%. For the GOCO award sample size of 690, the confidence limits were computed to be between 66% and 74%.

The justifications given for making single or sole source awards at the GOCO's have a similar distribution to that found in the CPSR's for the prime contractors. Table 2.6 lists the GOCO's justifications as found in the award files during the CPSR's.

F. OPPORTUNITIES AND CONSTRAINTS IN SUBCONTRACT COMPETITION.

Discussions with industry and Government personnel disclosed that major system contractors generally consider the constraints to competition to be the same as the justifications for single/sole source awards on the CPSR's. They were uniform in their argument that they are very competitive in the

TABLE 2.5

ADEQUATE AND EFFECTIVE COMPETITION
FOR GOCO'S

	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	TOTAL
		Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000			
Awards Reviewed	219	172,530,000	246	13,010,918	225	3,839,991	690	189,380,909	
Sample Awards Made Competitively:	163	137,380,000	180	9,574,688	141	2,520,457	484	149,480,000	
To Low Bidder	156	106,245,983	175	9,261,368	136	2,430,865	467	117,940,000	
To Other Than Low Bidder	7	31,134,017	5	313,320	5	89,592	17	31,536,929	
Awarded Without Competition	56	35,142,784	66	3,136,230	84	1,319,534	206	39,898,548	
Percentage of Sample Awards/ Bidders Made Competitively	74.43%	79.63%	73.17%	73.59%	62.67%	65.64%	70.14%	78.93%	

DEPTH OF COMPETITION

Competitive Awards	163	130	141	494
No. of Quotes Solicited	1370	1313	1072	3755
Responsive Quotes Received	660	663	558	1881
Average Depth of Competition	4.05	3.68	3.96	3.89

TABLE 2.6

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR GOCO'S

	<u>No.</u>	<u>Dollars</u>	<u>\$ 25,000- \$100,000</u>		<u>\$10,000- \$25,000</u>		<u>TOTAL</u>			
			<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>%</u>	<u>Dollars</u>	<u>%</u>
Customer Directed	2	454,461	11	485,862	4	79,863	17	8.33	1,020,186	2.56
Engineer Directed	4	2,931,765	7	366,050	7	98,737	18	8.82	3,396,552	8.54
Proprietary Item	2	376,654	6	331,860	10	174,771	18	8.82	883,285	2.22
Only Supplier Qualified	30	20,934,410	25	1,300,874	36	541,527	91	44.61	22,776,811	57.24
Economically Justified (Tooling, qualification test, delivery, etc.)	10	4,035,952	10	506,271	9	143,232	29	14.22	4,685,455	11.77
Other Justifiable Reasons	5	4,984,567	7	345,115	14	251,491	26	12.75	5,581,173	14.02
Inadequate Justification	3	1,424,975	0	0	2	26,791	5	2.45	1,451,766	3.65
TOTALS	56	35,142,784	66	3,336,032	82	1,316,412	204	100.00	39,795,228	100.00

system development phase and follow source selection procedures. However, they competitively select their major subcontractors and then usually become "locked into them" in the production phase as a single or sole source. Although some potential for competition may exist in the production phase, the contractors agreed that no funds are programmed by the Government to develop subcontract competition or perform acceptance testing. This becomes further complicated in those instances when the quantities of an item to be subcontracted are so small that tooling and testing costs tend to make additional competition economically unfeasible.

The factors influencing the ability to award subcontracts competitively are summarized in Table 2.7 in the form of needs, opportunities and constraints. Adequate industrial base can be considered to be the most basic need of competition. This need presumes that the industrial base contains more than one willing supplier who can satisfy the requirement. Such opportunities as program stability, vendor interest in Government defense work, good technical data packages (TDP), adequate tooling and production quantities for allocation of startup costs, and detailed planning are all factors which influence the ability to find sources for the conduct of competition. These opportunities are constrained, however, by such realities as the Government funding process and other contributors to the lack of program stability and complicated Government contractual requirements and "red tape" which tend to discourage vendor interest in defense work. The technology required in many defense programs is often limited to a small number of sources, and the high startup costs make entry into a new field extremely difficult. Neither contractor nor Government funding appear to be adequate to provide the capital investment required to provide a production capacity to support

TABLE 2.7

COMPETITION NEEDS, OPPORTUNITIES AND CONSTRAINTS

NEEDS	OPPORTUNITIES	CONSTRAINTS
Adequate Industrial Base	• Provide Program Stability • Increase Vendor Interest in Government Contracts • Develop Better TDP's • Plan Early • Provide Government Tooling • Other	• Government Funding Process • Complicated Government Contract Requirements • Availability of Technology • High Startup Costs • Proprietary Items • Availability of Government Money • Other
Provision for Competition Early in Development and Sustainment Through Production	• Provide Multisourcing Throughout Program • Plan for Sustained Competition - Identification of Items Amenable - Schedule Enough Time for Contractors to Conduct Competition • Provide Funds for Qualification Testing • Other	• Other Program Objectives May Have Higher Priority than Competition • Certain Items Not Susceptible to Sustained Competition • Other
Short Term Investment Capital to Generate Long Term Savings from Competition	• Plan into Program Funding for Initiating and Sustaining Subcontractor Competition • Plan for Prime to do it with Adequate Reward System • Other	• Structure of Government Funding Program • Other

competition that would be economically worthwhile.

A trend became apparent during the data collection phase of this study which indicated that subcontracting under system contracts is very competitive in the development phase of the life cycle and decreases in production as suppliers become single sources. This trend indicates that a second need of competition is to make provision for competition early in development and plan to sustain competition throughout production. This need can be satisfied by planning for a sustainable multisource capability in a rational manner. Items which are amenable to sustained competition should be identified at the earliest possible time by considering those opportunities and constraints identified in Table 2.7. Then, time and money should be made available to qualify additional sources and physically conduct competitions. This is easier said than done since many other program objectives may have higher priority than competition.

The availability of funds is another need which must be satisfied to be able to plan for and sustain competition. Short term investment capital must be available in order to generate long term savings from competition. If funds are not programmed by the Government for qualification testing of alternate vendors, or the contractor is unable/unwilling to commit internal funds, opportunities for savings will be lost. A good example of this is found in the Fighting Vehicle System (FVS). The cost of a generator from the only approved subcontractor is \$1917.92, while an alternate vendor (who is currently a single source vendor for a similar generator on the M113) has proposed to provide the generator for \$936.73 or a \$558,714 savings over 600 vehicles. Qualification testing and tooling costs are estimated to be \$221,227 which would reduce the savings to a net of \$337,487.

The Government does not have the \$221,227 to invest, and the contractor has no incentive to spend corporate funds unilaterally when there will not be a return on the investment. In the absence of Government funds, a suitable incentive and reward mechanism must be developed to encourage contractor investment.

CHAPTER III

CONCLUSIONS AND POLICY CONSIDERATIONS

A. INTRODUCTION.

The data displayed in this study indicates that substantial portions of subcontracted dollars are spent noncompetitively; however, the crucial question involves the practical feasibility of increasing subcontract competition to what can be construed to be an optimal amount considering many other Government programs, goals, initiatives, and constraints. The conclusions and policy considerations which follow are drawn from available subcontract competition data and address this practical feasibility.

B. CONCLUSIONS.

1. A substantial portion of defense dollars are redistributed competitively under prime contracts which are themselves noncompetitive. Although the method of aggregation of CPSR data prevents a precise determination of the amount of subcontract competition, the data does provide estimates for DOD wide contracts and GOCO's.

a. Of the DOD subcontract sample, 52.12% of the awards were made competitively which represented 42.94% of the dollars.

b. Similarly, of the subcontract sample for GOCO's, 70.14% of the awards were made competitively which represented 78.93% of the dollars.

2. The 12 major systems reviewed showed a weighted average of 38.0% competitive dollars using purchased material as a baseline. However, the systems exhibited a large variation from system to system--3.9% to 92.3%.

3. The extent of subcontract competition is a function of many opportunities and constraints, and the potential for subcontract competition can vary widely from system to system, and from contract to contract. A

determination that an exhibited level of competition on an individual system is acceptable or not acceptable could only be made with a thorough analysis of all variables and program objectives which impact on that specific acquisition. Since the evaluation of success in competition could result in a wide range of acceptable degrees of subcontract competition, a single goal or standard of acceptability would be inappropriate.

4. The level of subcontract competition can be increased; however, any sweeping changes in exhibited levels of competition would require relaxation of many existing constraints, and could conflict with quality, schedule, and other Government objectives.

C. POLICY CONSIDERATIONS.

The level of subcontract competition can be increased if funds and time are available to generate new sources and test their products. Such an undertaking would require significant planning early in the development cycle. The measure of success in subcontract competition is dependent on the potential for subcontract competition and varies from system to system and from contract to contract. Therefore, each system or contract should be viewed independently by considering all factors affecting or influencing competition. Because of varying degrees of competition potential and the uniqueness of each system or contract, a specific contract clause or goal for subcontract competition is not appropriate.

APPENDIX A

CPSR DATA BY DCAS REGION

Appendix A lists tables illustrating the amount of adequate and effective competition based on the sample of awards reviewed by each DCAS region. Also included are tables listing the justification for single/sole source awards for each region.

TABLE A.1

ADEQUATE AND EFFECTIVE COMPETITION
FOR ATLANTA REGION

	Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000		Under \$10,000		TOTAL	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Awards Reviewed	123	76,240,680	168	7,997,860	242	3,866,830	462	1,766,630	995	89,872,000
Sample Awards Made Competitively	60	21,495,294	68	3,496,320	108	1,664,358	228	856,204	464	27,512,176
Awarded Without Competition	63	54,745,119	100	4,501,540	134	2,202,472	234	910,426	531	62,359,557
Percentage of Sample Awards/Dollars Made Competitively	48.78%	28.19%	40.48%	43.72%	44.63%	43.04%	49.35%	48.47%	46.63%	30.61%

DEPTH OF COMPETITION

Competitive Awards	60	68	108	228	464
No. of Quotes Solicited	308	285	1053	681	1617
Responsive Quotes Received	179	177	283	585	1224
Average Depth of Competition	2.98	2.60	2.62	2.57	2.64

TABLE A.2

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR ATLANTA REGION

	<u>Over \$100,000</u>		<u>\$ 25,000- \$100,000</u>		<u>\$10,000- \$25,000</u>		<u>Under \$10,000</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>
Customer Directed	1	527,400	3	108,803	2	35,700	3	18,239	9	690,142
Engineer Directed	7	14,158,565	15	628,683	16	264,167	28	110,954	66	15,162,369
Proprietary Item	2	345,619	3	126,755	3	51,290	3	11,304	11	534,968
Only Supplier Qualified	33	17,831,049	46	2,134,802	68	1,105,299	138	537,602	285	21,608,752
Economically Justified (Tooling, qualification test, delivery, etc.)	12	5,279,035	9	329,158	21	348,508	23	103,064	65	6,059,765
Other Justifiable Reasons	8	16,603,718	23	1,147,614	22	373,120	33	104,784	86	18,229,236
Inadequate Justification	0	0	1	25,725	2	24,388	6	24,479	9	74,592
TOTALS	63	54,745,386	100	4,501,540	134	2,202,472	234	910,426	531	62,359,824

TABLE A.3

ADEQUATE AND EFFECTIVE COMPETITION
FOR BOSTON REGION

	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	TOTAL
		Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000					
Awards Reviewed	82	39,321,000	171	8,231,000	170	2,783,000	423	50,335,000			
Sample Awards Made Competitively	52	26,141,000	70	3,394,000	71	1,181,000	193	30,719,000			
Awarded Without Competition	30	13,177,000	101	4,837,000	99	1,602,000	230	19,616,000			
Percentage of Sample Awards/ Dollars Made Competitively	63.41%	66.48%	40.94%	41.23%	41.76%	42.44%	45.63%	61.03%			

DEPTH OF COMPETITION

Competitive Awards	52	70	193
No. of Quotes Solicited	169	217	600
Responsive Quotes Received	134	184	504
Average Depth of Competition	2.58	2.63	2.61

TABLE A.4

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR BOSTON REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	4	0	0	4
Engineer Directed	1	8	10	19
Proprietary Item	0	5	7	12
Only Supplier Qualified	8	51	36	95
Economically Justified (Tooling, qualification test, delivery, etc.)	12	35	40	87
Other Justifiable Reasons	5	2	6	13
Inadequate Justification	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTALS	30	101	99	230

TABLE A.5

ADEQUATE AND EFFECTIVE COMPETITION
FOR CHICAGO REGION

	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	TOTAL
		Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000					
Awards Reviewed	76	21,194,106	91	4,378,960	121	1,904,403	288	27,477,469			
Sample Awards Made Competitively	54	13,054,244	68	3,155,524	91	1,418,073	213	17,627,841			
Awarded Without Competition	18	8,139,862	23	1,223,436	30	486,330	71	9,849,628			
Percentage of Sample Awards/ Dollars Made Competitively	71.05%	61.59%	74.72%	72.06%	75.21%	74.46%	73.96%	64.15%			

DEPTH OF COMPETITION

Competitive Awards	54	68	91	213
No. of Quotes Solicited	210	234	315	759
Responsive Quotes Received	173	202	276	657
Average Depth of Competition	3.20	3.06	3.03	3.08

TABLE A.6

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR CHICAGO REGION

	No.	<u>Dollars</u>	No.	<u>\$ 25,000- \$100,000</u>	No.	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
Customer Directed	2	1,562,000	1	59,305	2	28,055	
Engineer Directed	0		3	210,063	6	95,614	1,649,360
Proprietary Item	4	999,962	4	225,833	3	49,768	305,677
Only Supplier Qualified	9	5,148,900	8	370,860	6	88,388	1,275,563
Economically Justified (Tooling, qualification test, delivery, etc.)	3	429,000	6	309,007	12	214,435	5,608,148
Other Justifiable Reasons	0	0	1	48,368	0		952,442
Inadequate Justification	0	0	0	0	1	10,070	
TOTALS	18	8,139,862	23	1,223,436	30	486,330	9,849,628

TABLE A.7

ADEQUATE AND EFFECTIVE COMPETITION
FOR CLEVELAND REGION

	Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000		Under \$10,000		TOTAL	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Awards Reviewed	111	25,571,805	165	7,708,096	172	2,670,404	223	758,685	671	36,708,990
Sample Awards Made Competitively:	91	20,865,638	132	6,151,078	140	2,156,862	175	621,622	538	29,795,200
Awarded Without Compe- tition	20	4,705,807	33	1,557,018	32	513,542	48	137,062	133	6,913,429
Percentage of Sample Awards/Dollars Made Competitively	81.98%	81.60%	78.79%	79.80%	76.74%	80.77%	73.09%	81.93%	76.90%	81.17%

DEPTH OF COMPETITION

Competitive Awards	91	132	140	175	538
No. of Quotes Received	381	471	552	651	2055
Responsive Quotes Received	290	379	414	546	1629
Average Depth of Competition	3.19	2.87	2.96	3.12	3.03

TABLE A.8

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR CLEVELAND REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>Under \$10,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	3	0	2	0	5
Engineer Directed	0	0	4	10	14
Proprietary Item	0	1	1	2	4
Only Supplier Qualified	10	10	12	11	43
Economically Justified (Tooling, qualification test, delivery, etc.)	2	13	11	18	44
Other Justifiable Reasons	5	9	2	5	21
Inadequate Justification	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>2</u>
TOTALS	20	33	32	48	133

TABLE A.9

ADEQUATE AND EFFECTIVE COMPETITION
FOR DALLAS REGION

	Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000		Under \$10,000		TOTAL	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Awards Reviewed	113	45,975,087	241	11,680,415	246	4,091,856	180	958,995	780	62,706,353
Sample Awards Made Competitively	75	27,789,642	136	6,698,900	134	2,239,998	109	549,710	454	37,278,250
Awarded Without Competition	38	18,185,445	105	4,981,511	112	1,851,862	71	409,285	326	25,428,103
Percentage of Sample Awards/Dollars Made Competitively	66.37%	60.45%	56.43%	57.35%	54.47%	54.74%	60.56%	57.32%	58.21%	59.45%
DEPTH OF COMPETITION										
Competitive Awards	75		136		134		109		454	
No. of Quotes Solicited	276		472		461		346		1555	
Responsive Quotes Received	222		375		387		280		1253	
Average Depth of Competition	2.96		2.76		2.89		2.57		2.76	

TABLE A.10

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR DALLAS REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>Under \$10,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	12	18	4	0	34
Engineer Directed	2	12	30	5	49
Proprietary Item	1	16	6	3	26
Only Supplier Qualified	16	38	29	27	110
Economically Justified (Tooling, qualification test, delivery, etc.)	2	8	16	10	36
Other Justifiable Reasons	4	11	26	19	60
Inadequate Justification	<u>1</u>	<u>2</u>	<u>1</u>	<u>7</u>	<u>11</u>
TOTALS	38	105	112	71	326

TABLE A.11

ADEQUATE AND EFFECTIVE COMPETITION
FOR LOS ANGELES REGION

	Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000		TOTAL	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Awards Reviewed	134	81,217,128	320	4,830,892	377	5,895,302	831	101,913,320
Sample Awards Made Competitively	50	13,561,901	150	6,742,634	155	2,346,995	355	22,651,530
Awarded Without Competition	84	67,655,227	170	8,058,258	222	3,548,307	476	79,261,792
Percentage of Sample Awards/ Dollars Made Competitively	37.31%	16.70%	46.88%	45.56%	41.11%	39.81%	42.72%	22.22%
DEPTH OF COMPETITION								
Competitive Awards	50		150		155		355	
No. of Quotes Solicited	195		485		493		1173	
Responsive Quotes Received	142		406		436		984	
Average Depth of Competition	2.84		2.71		2.81		2.77	

TABLE A.12

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR LOS ANGELES REGION

	<u>Over</u> <u>\$100,000</u>	<u>\$ 25,000-</u> <u>\$100,000</u>	<u>\$10,000-</u> <u>\$25,000</u>	<u>TOTAL</u>
	<u>No.</u> <u>Dollars</u>	<u>No.</u> <u>Dollars</u>	<u>No.</u> <u>Dollars</u>	<u>No.</u> <u>Dollars</u>
Customer Directed	2 1,061,045	2 107,800	0 0	4 1,168,845
Engineer Directed	8 3,170,476	24 1,176,249	32 498,020	64 4,844,745
Proprietary Item	2 317,758	4 166,641	8 178,428	14 622,827
Only Supplier Qualified	37 43,017,881	48 2,038,100	45 731,310	130 45,787,291
Economically Justified (Tooling, qualification test, delivery, etc.)	26 17,727,680	54 1,201,411	90 1,498,877	170 20,427,968
Other Justifiable Reasons	9 1,944,783	30 1,495,693	35 530,304	74 3,970,780
Inadequate Justification	3 415,094	8 404,770	12 195,334	23 1,015,198
TOTALS	84 67,654,117	170 6,590,664	222 8,114,273	476 82,359,654

TABLE A.13

ADEQUATE AND EFFECTIVE COMPETITION
FOR NEW YORK REGION

	Over \$100,000		\$ 25,000- \$100,000		\$10,000- \$25,000		TOTAL	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Awards Reviewed	90	24,223,000	175	8,057,000	183	3,008,000	448	35,288,000
Sample Awards Made Competitively	30	6,831,000	56	2,445,000	55	885,000	141	10,161,000
Awarded Without Competition	60	17,392	119	5,612,000	128	2,123,000	307	25,127,000
Percentage of Sample Awards/ Dollars Made Competitively	33.33%	28.20%	32.00%	30.35%	30.05%	29.42%	31.47%	23.79%
DEPTH OF COMPETITION								
Competitive Awards	30		56		55		141	
No. of Quotes Solicited	143		218		173		534	
Responsive Quotes Received	99		155		142		396	
Average Depth of Competition	3.30		2.77		2.58		2.81	

TABLE A.14

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR NEW YORK REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	4	3	4	11
Engineer Directed	2	12	13	27
Proprietary Item	1	7	12	20
Only Supplier Qualified	47	71	74	192
Economically Justified (Tooling, qualification test, delivery, etc.)	0	21	15	36
Other Justifiable Reasons	2	10	6	18
Inadequate Justification	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
TOTALS	56	124	125	305

TABLE A.15

ADEQUATE AND EFFECTIVE COMPETITION
FOR PHILADELPHIA REGION

	<u>Over</u> <u>\$100,000</u>		<u>\$ 25,000-</u> <u>\$100,000</u>		<u>\$10,000-</u> <u>\$25,000</u>		<u>TOTAL</u>
	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>
Awards Reviewed	118	51,155,000	203	10,783,000	212	3,711,000	533
Sample Awards Made Competitively	51	14,445,000	116	5,745,000	126	2,160,000	293
Awarded Without Competition	67	37,917,000	87	4,936,000	86	1,501,000	240
Percentage of Sample Awards/ Dollars Made Competitively	43.22%	28.24%	57.14%	53.28%	59.43%	58.21%	54.97%
							32.22%

DEPTH OF COMPETITION

Competitive Awards	51	116	126	293
No. of Quotes Solicited	201	388	465	1054
Responsive Quotes Received	136	305	382	823
Average Depth of Competition	2.67	2.63	3.03	2.81

TABLE A.16

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR PHILADELPHIA REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	12	18	8	38
Engineer Directed	2	3	6	11
Proprietary Item	0	1	5	6
Only Supplier Qualified	13	25	24	62
Economically Justified (Tooling, qualification test, delivery, etc.)	10	22	15	47
Other Justifiable Reasons	30	19	24	73
Inadequate Justification	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
TOTALS	67	88	83	238

TABLE A.17

ADEQUATE AND EFFECTIVE COMPETITION
FOR ST. LOUIS REGION

	<u>Over</u> <u>\$100,000</u>		<u>\$ 25,000-</u> <u>\$100,000</u>		<u>\$10,000-</u> <u>\$25,000</u>		<u>TOTAL</u>	
	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>	<u>No.</u>	<u>Dollars</u>
Awards Reviewed	121	43,060,000	233	11,300,000	233	3,801,000	587	58,161,000
Sample Awards Made Competitively	63	21,756,000	115	5,468,000	126	2,003,000	304	29,227,000
Awarded Without Competition	58	21,303,000	118	5,834,000	107	1,796,000	283	28,933,000
Percentage of Sample Awards/ Dollars Made Competitively	47.93%	50.52%	50.64%	48.39%	45.92%	52.70%	48.21%	50.25%

DEPTH OF COMPETITION

Competitive Awards	63	115	126	304
No. of Quotes Solicited	257	354	360	971
Responsive Quotes Received	158	271	306	735
Average Depth of Competition	2.50	2.36	2.43	2.42

TABLE A.18

JUSTIFICATION FOR SINGLE/SOLE SOURCE AWARDS
FOR ST. LOUIS REGION

	<u>Over \$100,000</u>	<u>\$ 25,000- \$100,000</u>	<u>\$10,000- \$25,000</u>	<u>TOTAL</u>
	<u>No.</u>	<u>No.</u>	<u>No.</u>	<u>No.</u>
Customer Directed	8	13	13	34
Engineer Directed	11	17	28	56
Proprietary Item	2	7	7	16
Only Supplier Qualified	28	59	44	131
Economically Justified (Tooling, qualification test, delivery, etc.)	6	21	17	44
Other Justifiable Reasons	8	15	14	37
Inadequate Justification	<u>0</u>	<u>2</u>	<u>0</u>	<u>2</u>
TOTALS	63	134	123	320

APPENDIX B

95% CONFIDENCE INTERVALS FOR PERCENTAGES OF COMPETITION IN SUBCONTRACTING

Table B.1 in this appendix lists 95% confidence intervals for an estimation of what the population percentage of awards made competitively might be in each DCAS region. Based on the sample size for each region the population percentage for the 95% confidence intervals along with the respective degree of accuracy is listed. The formula used to calculate the 95% confidence limits is:

$$p \pm 1.96 \sqrt{\frac{p(100-p)}{n}}$$

where p is the percentage of sample awards made competitively and n is the number of awards reviewed.

TABLE B.1

95% CONFIDENCE INTERVALS FOR PERCENTAGES OF COMPETITION IN SUBCONTRACTING
BY DCAS REGIONS

	<u>Sample Size</u>	<u>Degree of Accuracy</u>	<u>Confidence Interval</u>
Atlanta	995	3.11	43.53 - 49.73
Boston	423	4.76	40.88 - 50.38
Chicago	288	5.77	68.89 - 79.03
Cleveland	671	3.78	73.71 - 80.09
Dallas	780	3.51	54.75 - 61.67
Los Angeles	831	3.40	39.36 - 46.08
New York	448	4.63	27.17 - 35.77
Philadelphia	533	4.24	50.75 - 59.19
St. Louis	587	4.04	44.17 - 52.25

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STUDY TEAM COMPOSITION

Wayne V. Zabel, Project Officer, Procurement Analyst, US Army Procurement Research Office, Army Materiel Systems Analysis Activity, Fort Lee, Virginia. B.A. in Economics, 1965, North Park College, Illinois. M.S. in Procurement and Contract Management, Florida Institute of Technology, 1978. From May 1966 through May 1974, Mr. Zabel worked for DCASR, Chicago, as a Contract Administrator; and from May 1974 through May 1977, he was an instructor for the Defense Advanced Procurement Management Course (renamed Management of Defense Acquisition Contract Course (Adv)), at the Army Logistics Management Center, Fort Lee, Virginia.

Monte G. Norton, P.E., B.S. in Industrial Engineering, North Dakota State University, 1969. M.E., Industrial Engineering, Texas A&M University, 1970. Industrial Engineer, US Army Procurement Research Office, AMSAA. Prior to joining the US Army Procurement Research Office, Mr. Norton was an Industrial Engineer with the US Army Installation Support Activity, Europe and an Operations Research Analyst with the Defense Logistics Studies Information Exchange (DLSIE). Before that, Mr. Norton was a General Engineer with the Safeguard System Command, Alabama, and has been a Government subcontractor.

Charles M. Lowe, Jr., Procurement Analyst, US Army Procurement Research Office, Fort Lee, Virginia. B.B.A, East Texas State University, 1974; M.B.A., Southern Illinois University-Edwardsville, 1977; M.S., Florida Institute of Technology, 1978. Prior to joining the Army Procurement Research Office, Mr. Lowe was a Procurement Analyst in the Directorate for Procurement and Production, US Army Troop Support and Aviation Materiel Readiness Command.

Charles A. Correia, B.S., University of Massachusetts, 1960; M.A., University of Mississippi, 1961; M.S., Virginia Polytechnic Institute and State University, 1971. Operations Research Analyst, US Army Procurement Research Office, AMSAA. Mr. Correia has worked on APRO projects in the areas of cost estimating techniques, forecasting methods, productivity, and life cycle costing. In addition to his research position, Mr. Correia instructs in several local colleges and universities. Prior to joining the APRO, Mr. Correia was an instructor of Mathematics at Southeastern Massachusetts University.

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Conclusions. The extent of subcontract competition is a function of many opportunities and constraints, and the potential for subcontract competition can vary widely from system to system and from contract to contract. The level of subcontract competition can be increased; however, existing constraints must be identified and relaxed, and funds and time must be planned and programed early in the development cycle to generate new sources and test their products.

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