REPORTS TO PROMOTE COMPETITION

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Executive Summary

REPORTS TO PROMOTE COMPETITION

We urge the introduction of a new set of reports to promote competition in contracting throughout the Department of Defense. Data for the reports come from the existing Procurement Management Reporting System, which contains detailed information on all DoD contract actions over $25,000. The reports would not only show, by purchasing activity and by type of item, how much competition was achieved; they would also reveal opportunities for increase.

Tests we have undertaken in cooperation with the competition advocates of the Military Departments convince us of the reports' value, particularly when applied to purchasing activities that receive less scrutiny than those that purchase major weapon systems.

We recommend implementation of the reports by the Office of the Secretary of Defense (OSD) and the Military Departments. The report programs are written for DoD-wide coverage and for use in a DoD computer facility. They are easily adapted for use by individual Military Departments, Commands, or purchasing activities. The information generated will help OSD and the Military Departments promote competition.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PAGE</strong></td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
</tr>
</tbody>
</table>

## CHAPTER

<table>
<thead>
<tr>
<th>1</th>
<th>INTRODUCTION</th>
<th>1-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>1-1</td>
<td></td>
</tr>
<tr>
<td>Competitive Performance Information Reports</td>
<td>1-1</td>
<td></td>
</tr>
<tr>
<td>A Test of the Reports</td>
<td>1-3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th>INFORMATION REPORTS</th>
<th>2-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report No. 1: FSC Competitive Rate</td>
<td>2-1</td>
<td></td>
</tr>
<tr>
<td>Report No. 2: Purchasing Activity Performance Summary</td>
<td>2-1</td>
<td></td>
</tr>
<tr>
<td>Report No. 3: Anomalies Ratio Ranking</td>
<td>2-5</td>
<td></td>
</tr>
</tbody>
</table>

## APPENDIX – DESCRIPTION OF REPORT PROGRAMS |

| iii |
1. INTRODUCTION

BACKGROUND

According to Department of Defense policy, goods and services are to be acquired on a competitive basis whenever practicable. In August 1984, DoD Directive 4245.9, entitled "Competitive Acquisitions," was issued to provide policies, prescribe procedures, and assign responsibilities for the competitive acquisition of goods and services. The directive, in part, instructs the Military Departments to appoint competition advocates and assigns them responsibility for reviewing and challenging noncompetitive procurements.

Our objective was to develop and test management information reports to assist DoD in increasing competition in contracting. The development of these reports was facilitated by the existence of DoD's Procurement Management Reporting System (PMRS). The PMRS, using data from the Individual Contracting Action Report (DD Form 350), contains detailed information about every procurement action that obligates $25,000 or more. The PMRS measures progress toward a variety of procurement goals, yet DoD makes little use of the system to foster competition. In this study, we have developed management information reports to assist the Office of the Secretary of Defense (OSD) and the competition advocates in promoting competition.

COMPETITIVE PERFORMANCE INFORMATION REPORTS

Competitive procurement performance is usually measured by the rate of competition: the dollars obligated by means of competition as a percentage of total dollars obligated. In standard DoD reports, competitive procurements are defined to include those made initially on the basis of price competition, whether by formal advertising or negotiation, plus those made on the basis of design or technical competition.

DoD's overall rate of competition, however, is not a useful management indicator for individual purchasing activities or other levels such as commands. The reason is that an individual purchasing activity generally acquires a mix of items quite different from the overall DoD mix or even from the
mix in its Military Service or Command. One purchasing activity may record a high rate of
competition because most of the items it buys are generally subject to competition. Another activity
may show a relatively low rate of competition because the items it buys are generally not subject to
competition. Consequently, any assessment of competitive performance must take account of what is
purchased and the rate of competition usually associated with that type of purchase.

For this reason, the proposed reports make use of the concept of a purchasing activity's
anticipated competitive rate. That rate is based on the activity's attaining the same rate of
competition as the average DoD rate for each type of item purchased by the activity. Items are
described by Federal Supply Classes (FSCs); average DoD rate is defined as the percentage of total
dollars awarded competitively for all DoD purchases of a particular FSC. For example, a purchasing
activity that uses half its funds to buy cartridges, with an anticipated competitive rate of 40 percent,
and half its funds to buy fuzes, with an anticipated competitive rate of 20 percent, would have an
anticipated competitive rate of 30 percent.

If an activity's overall rate of competition exceeds the anticipated rate, then it, on balance,
obeys more competition than expected considering the composition of items it acquires. An activity
whose overall rate of competition is higher than anticipated does not necessarily achieve a high
absolute rate. Instead, it achieves a rate of competition that exceeds what would have been expected
from average DoD experience applied to the items acquired.

We have developed three separate but related reports. Report No. 1 calculates the DoD
average competitive rate for each FSC item purchased. For each of the approximately
1,000 purchasing activities, Report No. 2 computes the rate of competition anticipated for the activity
if it attained the DoD average for each item, and the activity's actual competitive rate. The ratio of
the actual competitive rate to the anticipated rate is called the "anomalies ratio" and is used to
measure each purchasing activity's performance.

Report No. 3 ranks activities on the basis of the anomalies ratio. A ratio of 1.2 means that the
particular activity achieved 20 percent more competition than the rate anticipated had it equaled
DoD's average rate for each FSC item purchased. A ratio of 0.8 means 20 percent less competition
than was expected if the activity matched the DoD average rate for the items purchased. Thus, the anomalies ratio measures relative achievement after taking into account the mix of items purchased.

A TEST OF THE REPORTS

We prepared prototype reports based on fiscal year (FY) 1984 data. The reports were reviewed by the competition advocates. The reports were intended to assess the usefulness of the anomalies ratio and the supporting output used to compute the ratio as a management information tool. We found:

- The anomalies ratio is a useful tool for identifying purchasing activities that are above or below average in performance. Once such an activity is identified, the report of activity performance by FSC item (Report No. 2) is a useful means of evaluating and helping the activity to increase competition because the FSCs causing deviations are shown.

- Major systems are already subject to a great deal of scrutiny by the competition advocates. Therefore, our reports are most useful for activities that purchase a mix of items rather than a major system.

We recommend that the OSD and competition advocates of the Military Departments:

- Survey purchasing activities with high anomalies ratios to find methods that may be transferable to other activities.

- Identify activities that have below-average anomalies ratios and seek explanations and develop plans, if necessary, to improve performance.

- Develop competitive rates by FSC for each Military Department to increase the sensitivity of the results to that Military Department's specific needs.

- Pursue follow-up development to include:
  - Identification of the largest dollar noncompetitive FSCs;
  - Anomalies rankings based on other definitions of competition;
  - Implementation of the competitive performance information reports on an in-house computer. We developed programs that are readily transferable to System K1, a computer system that is accessible by OSD and the Military Departments.
2. INFORMATION REPORTS

The proposed series of three related reports is based on information in DoD's Procurement Management Reporting System. To develop and test the reports we used a data tape of DD Form 350's containing all procurement actions exceeding $25,000 in value in FY 1984. For each action, information was retrieved from the tape, indicating the purchasing activity dollars obligated as a consequence of the action, the product or service involved, and the competitive status of the action. (See the Appendix for details.)

On the basis of this information, the three reports were prepared. The following sections present an illustration of each report and describe its construction.

REPORT NO. 1: FSC COMPETITIVE RATE

Report No. 1 shows the competitive rate for each FSC—the total dollar amount procured competitively for the FSC divided by the total dollar amount awarded for the FSC. This report also shows the number of procurement actions for the FSC and the number of those actions that were the result of competition (see Table 2-1).

For each FSC, Report No. 1 lists the number of actions, dollars obligated, ratio of each FSC's awards to the DoD total dollars obligated, number of competitive actions, dollar value of competitive obligations, and the FSC's competitive percentage. DoD-wide grand totals are also produced, indicating for the fiscal year covered, total actions, total dollars obligated, number of competitive actions competitive dollars obligated, and overall competitive percentage. Report No. 1 is useful to focus on those FSCs that account for the largest proportion of dollars and those that are typically low in competitive procurements.

REPORT NO. 2: PURCHASING ACTIVITY PERFORMANCE SUMMARY

Report No. 2 provides purchasing activity managers with information for taking action to increase competition. Each FSC purchased by the activity is listed along with the rate of competition achieved by the activity. Combining this information with the overall DoD rate of competition for
<table>
<thead>
<tr>
<th>FSC</th>
<th>PRODUCT OR SERVICE</th>
<th>NUMBER OF ACTIONS</th>
<th>TOTAL DOLLARS OBLIGATED ($000)</th>
<th>PERCENTAGE OF TOTAL</th>
<th>NUMBER OF COMPETITIVE ACTIONS</th>
<th>COMPETITIVE DOLLARS OBLIGATED ($000)</th>
<th>FSC COMPETITIVE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC24</td>
<td>RDT&amp;E/Missile and Space System</td>
<td>8</td>
<td>566</td>
<td>0.01</td>
<td>1</td>
<td>35</td>
<td>0.06</td>
</tr>
<tr>
<td>J070</td>
<td>Maint-repair of Eq/ADP</td>
<td>6</td>
<td>641</td>
<td>0.01</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>R339</td>
<td>Other ADP Services</td>
<td>23</td>
<td>2,875</td>
<td>0.02</td>
<td>6</td>
<td>2,078</td>
<td>0.72</td>
</tr>
<tr>
<td>1005</td>
<td>Guns through 30 mm</td>
<td>8</td>
<td>935</td>
<td>0.01</td>
<td>4</td>
<td>182</td>
<td>0.19</td>
</tr>
<tr>
<td>1560</td>
<td>Airframe Structural Components</td>
<td>13</td>
<td>4,368</td>
<td>0.04</td>
<td>5</td>
<td>665</td>
<td>0.15</td>
</tr>
<tr>
<td>5960</td>
<td>Electron Tubes and Assoc. Hardware</td>
<td>8</td>
<td>2,703</td>
<td>0.02</td>
<td>2</td>
<td>1,782</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9999</td>
<td>Miscellaneous</td>
<td>4</td>
<td>598</td>
<td>0.01</td>
<td>3</td>
<td>501</td>
<td>0.84</td>
</tr>
</tbody>
</table>
each of the FSCs purchased by the activity produces the anomalies ratio. The anomalies ratio indicates above- or below-average competitive performance after controlling for the mix of items purchased.

Table 2-2 presents a hypothetical Purchasing Activity Performance Summary. The data displayed in Table 2-2 illustrate the concepts used to produce the information in Report No. 2 including the anomalies ratio. Table 2-2 illustrates competitive performance during FY 1984 for hypothetical Army activity code OAAAXY. Listed first is the FSC description of each product or service purchased by the activity. Column (1) indicates the total number of actions carried out by the activity for every FSC it buys. Column (2) lists the associated values of dollars obligated, and column (3) displays the percentages of total obligations accounted for by that FSC.

The next three columns pertain to competitive procurement actions. Column (4) indicates the number of competitive actions for each FSC and column (5) shows the dollar value of the obligations represented by these competitive actions. The rate of competition, defined as the ratio of the dollar value of competitive obligations to the total dollar value of obligations, is shown in column (6). Note that the total at the bottom of column (6) is the activity’s overall competitive rate.

Column (7) (from Report No. 1) shows the DoD average rate of competition for each FSC purchased by the activity. In column (8), the DoD average rate of competition for each FSC is multiplied by the activity’s percentage of obligations associated with each FSC. This weighted average of competitive rate times the percentage of dollars obligated, when totaled over all FSCs purchased by the activity, produces the activity’s anticipated competitive rate based on average DoD results. This value is given by the “activity total” entry of column (8). The anomalies ratio is the ratio of the actual rate of competition (the total of column 6) to the anticipated rate of competition (the total of column 8). An anomalies ratio of one indicates that the activity achieved exactly what would have been the average DoD experience, given the FSC items purchased. An anomalies ratio greater than one indicates that the activity on balance exceeded DoD average rates of competition. An anomalies ratio of less than one shows that the activity on balance purchased its FSC items below those of DoD average rates of competition.
## Table 2-2. Report No. 2: Purchasing Activity Performance Summary

<table>
<thead>
<tr>
<th>FSC</th>
<th>Product or Service</th>
<th>(1) Number of Actions</th>
<th>(2) Total Dollars Obligated ($000)</th>
<th>(3) Percentage of Total</th>
<th>(4) Number of Competitive Actions</th>
<th>(5) Competitive Dollars Obligated ($000)</th>
<th>(6) PSC Percentage Competitive = (5) + (2)</th>
<th>(7) DoD Percentage Competitive = (3) x (7)</th>
<th>(8) DoD Percentage Competitive, Weighted = (3) x (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1005</td>
<td>Guns through 30 mm</td>
<td>10</td>
<td>$1,000</td>
<td>10.0</td>
<td>0</td>
<td>$0</td>
<td>0.0</td>
<td>10.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1316</td>
<td>Ammunition 75 mm through 125 mm</td>
<td>70</td>
<td>4,000</td>
<td>40.0</td>
<td>12</td>
<td>2,000</td>
<td>50.0</td>
<td>60.0</td>
<td>24.0</td>
</tr>
<tr>
<td>1370</td>
<td>Pyrotechnics</td>
<td>15</td>
<td>3,000</td>
<td>30.0</td>
<td>15</td>
<td>3,000</td>
<td>100.0</td>
<td>40.0</td>
<td>12.0</td>
</tr>
<tr>
<td>4240</td>
<td>Safety and Rescue Equipment</td>
<td>12</td>
<td>2,000</td>
<td>20.0</td>
<td>6</td>
<td>800</td>
<td>40.0</td>
<td>60.0</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>Activity Total</td>
<td>107</td>
<td>$10,000</td>
<td>100.0</td>
<td>33</td>
<td>$5,800</td>
<td>$5,800/10,000 = 58.0</td>
<td></td>
<td>49.0</td>
</tr>
</tbody>
</table>

Anomalies Ratio = (6) + (8) = 58/49 = 1.18
REPORT NO. 3: ANOMALIES RATIO RANKING

The final report ranks activities according to the anomalies ratio. Table 2-3 presents a hypothetical ranking.

<table>
<thead>
<tr>
<th>RANK</th>
<th>ACTIVITY</th>
<th>DOLLARS OBLIGATED ($000)</th>
<th>ANOMALIES RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OKF10</td>
<td>$153,107</td>
<td>6.13</td>
</tr>
<tr>
<td>2</td>
<td>LA771</td>
<td>343,308</td>
<td>6.01</td>
</tr>
<tr>
<td>3</td>
<td>OAA08</td>
<td>4,783</td>
<td>5.51</td>
</tr>
<tr>
<td>4</td>
<td>OAB04</td>
<td>256,360</td>
<td>4.98</td>
</tr>
<tr>
<td></td>
<td>OJK41</td>
<td>73,560</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Reports from DoD data covering FY 1984 indicate ratios ranging from zero to about six. The value of six for the high-ranking activities shows that they should have achieved competitive rates of perhaps 12 or 15 percent on the basis of DoD average experience for the FSCs purchased, but actually achieved competitive rates six times greater—about 70 to 90 percent.

Table 2-4 displays the range of anomalies ratios found among the 1,040 purchasing activities in FY 1984. Table 2-4 shows that the top quarter of the activities (ranked 1 to 260) had a range of anomalies ratios of from 6.55 to 1.294. The next quarter (ranked 261 to 520) had a ratio range of 1.291 to 1.065, and so on. It would thus appear that a good deal of variability exists for the performance measure indicating its usefulness as a discriminator of activity performance.
<table>
<thead>
<tr>
<th>ACTIVITY RANK</th>
<th>ANOMALIES RATIO: RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-260</td>
<td>6.55-1.29</td>
</tr>
<tr>
<td>261-520</td>
<td>1.29-1.07</td>
</tr>
<tr>
<td>521-780</td>
<td>1.06-0.73</td>
</tr>
<tr>
<td>781-1040</td>
<td>0.73-0.00</td>
</tr>
</tbody>
</table>
APPENDIX

DESCRIPTION OF REPORT PROGRAMS

LANGUAGE SELECTION

The proposed information reports use data from DD Form 350 (Figure A-1). A DD Form 350 is prepared for every contract action over $25,000. (Information about actions under $25,000 is aggregated and entered on a different form.) About 250,000 actions are now reported annually, and DD Form 350 reports 51 separate pieces of information about each action. A requirement for the proposed reports is a computer with the capacity to store and a language to manipulate a data base requiring 25 million bytes of storage area.

The programming language selected was the 1982 version of SAS, a product of SAS Institute Inc., Cary, North Carolina. This language, supported by IBM hardware only, provides data retrieval and management, programming, statistical, and reporting capabilities. SAS can handle large data bases, such as the DD 350 data for a fiscal year. SAS provides access to many statistical and data management functions through the use of commands. Yet SAS is more flexible than statistical software packages that perform specific statistical analyses and nothing else. SAS is also efficient in that it can quickly produce reports where the data must be sorted several times and aggregated in different ways.

The DD 350 data are currently compiled on tape by the Directorate for Information Operations and Reports (DIOR). The Federal Procurement Data Center (FPDC) makes the tapes available to the public. The FPDC format is based on Federal Form 279, and some detail about competition is lost when the DD 350 is translated by FPDC. Thus, it is preferable to work directly from DD 350 data. Access to the DD 350 data was obtained through the General Accounting Office (GAO) who maintains a data base of DD 350 information at The National Institutes of Health's computer facility.
# FIGURE A-1. DD FORM 350: INDIVIDUAL CONTRACTING ACTION REPORT

## INDIVIDUAL CONTRACTING ACTION REPORT (OVER $25,000)

### PART A

<table>
<thead>
<tr>
<th>Part A</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1. Type of Report</td>
<td>Original, Cancel, Correct, Other</td>
</tr>
<tr>
<td>a. Contract Number</td>
<td></td>
</tr>
<tr>
<td>b. Contract Number</td>
<td></td>
</tr>
<tr>
<td>c. Contract Number</td>
<td></td>
</tr>
<tr>
<td>d. Contract Number</td>
<td></td>
</tr>
</tbody>
</table>

### PART B

<table>
<thead>
<tr>
<th>Part B</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contract Number</td>
<td></td>
</tr>
<tr>
<td>2. MOD. ORDER OR OTHER NUMBER</td>
<td></td>
</tr>
<tr>
<td>3. ACTION DATE (MM/YY/DD)</td>
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</table>

### PART C

<table>
<thead>
<tr>
<th>Part C</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PRINCIPAL PLACE OF PERFORMANCE</td>
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<tr>
<td>2. CITY OR PLAC</td>
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</tr>
<tr>
<td>3. STATE OR COUNTRY</td>
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</table>

### PART D

<table>
<thead>
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<th>Part D</th>
<th>Description</th>
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<tbody>
<tr>
<td>1. CONTRACTING OFFICE</td>
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<tr>
<td>2. CONTRACTING OFFICE</td>
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<tr>
<td>3. CONTRACTING OFFICE</td>
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### PART E

<table>
<thead>
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<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1. ORIGINAL OR MODIFIED</td>
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</tr>
<tr>
<td>2. ID</td>
<td></td>
</tr>
<tr>
<td>3. ID</td>
<td></td>
</tr>
<tr>
<td>4. ID</td>
<td></td>
</tr>
</tbody>
</table>

### PART F

<table>
<thead>
<tr>
<th>Part F</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NAME OF CONTRACTING OFFICER OR REPRESENTATIVE</td>
<td></td>
</tr>
<tr>
<td>2. SIGNATURE</td>
<td></td>
</tr>
<tr>
<td>3. TELEPHONE NO.</td>
<td></td>
</tr>
<tr>
<td>4. DATE:</td>
<td></td>
</tr>
</tbody>
</table>

DD Form 350, MAY 83

Previous editions are obsolete.

A-2
DATA BASE PREPARATION

Figure A-2 is the SAS code that reads the tape and organizes the data into a SAS data file. Since the DD 350 is subject to periodic changes, the tape format associated with the form for a specific year must be obtained from DIOR. Consequently, the code in Figure A-2 may not be suitable for years other than fiscal year (FY) 1984.

FIGURE A-2. SETTING UP THE DD 350 DATA BASE

```
1  //UDJ JOB (VET1.778,R),DSJF
2  //ROUTE ZEO PT7430
3  //MESSAGE 059999
4  //ACCESS VSSXEJU
5  //PROC LIB DD DSM=ZABCBLU.PROCLIB,DISP=SHR
6  // EXEC SAS
7  //IN DD UNIT=PT7430,DISP=SHR
8  // DSM=DD35006,Vol=SER=059999
9  //FILE DD UNIT=FILE,Vol=SER=CTNL38
10  // DSM=VET/UDJ N.COMP,DISP=(NEV,CATLG)
11  // SPACE=(CYL,(15,1))
12  //SYSTR DD 0
13  DATA PRM.DA;
14  INFILE IN ;
15  INPUT PUCH 1 6-18 C0MM 1 11-25 DATE 41-44
16  OBL 121 TUTDOL 122-129 PSC 5 131-134
17  CLAIM 5 125-127 STS 1 140-146 RMS 203
18  KOND 5 103 NETH 1 154 EVENT 111
19  D12A 214 D138 215-216 D12C 127-129
20  PROC CONTENTS DATA=PRM.DA.
21  END;
```

Table A-1 displays the data elements and their position on the FY 1984 DD 350 tape.

DEFINING COMPETITION

Two variables are generated, one to identify the Service responsible for the action and a second to identify the competitive status of the action. The first three characters of the contract number show which Service or Agency initiated the action. The contract number was used to
TABLE A-1. DATA ITEMS FROM THE DD 350 TAPE

<table>
<thead>
<tr>
<th>DD FORM 350 ELEMENTS</th>
<th>DESCRIPTION</th>
<th>TAPE POSITION</th>
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<tbody>
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<td>A3</td>
<td>Purchasing Office Code</td>
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</tr>
<tr>
<td>B1</td>
<td>Contract Number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defense</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Activity</td>
<td>11-16</td>
</tr>
<tr>
<td></td>
<td>Fiscal year</td>
<td>17-18</td>
</tr>
<tr>
<td></td>
<td>Serial number</td>
<td>19-23</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>24-25</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>25-25</td>
</tr>
<tr>
<td>B6</td>
<td>Type of obligation</td>
<td>121</td>
</tr>
<tr>
<td>B7</td>
<td>Total dollars obligated/deobligated</td>
<td>122-130</td>
</tr>
<tr>
<td></td>
<td>(in thousands)</td>
<td></td>
</tr>
<tr>
<td>B8A</td>
<td>FSC or Service code</td>
<td>131-134</td>
</tr>
<tr>
<td>B8B</td>
<td>DoD claimant program number</td>
<td>135-137</td>
</tr>
<tr>
<td>B8C</td>
<td>System or equipment code</td>
<td>138-140</td>
</tr>
<tr>
<td>B12</td>
<td>Foreign military sale</td>
<td>202</td>
</tr>
<tr>
<td>B13</td>
<td>Kind of contracting action</td>
<td>203</td>
</tr>
<tr>
<td>C3</td>
<td>Method of contracting</td>
<td>206</td>
</tr>
<tr>
<td>C5</td>
<td>Extent of competition in negotiation</td>
<td>211</td>
</tr>
</tbody>
</table>

generate a variable, "DEPT," as shown in Table A-2. Figure A-3 is the program code which accomplishes it.¹

¹Actions ordered from the General Services Administration (GSA) supply schedule use the GSA contract number, which begins with the letters "GS." In a few instances, both the Army and the Air Force have purchasing activities with the same purchasing activity codes. In these instances, it is therefore impossible to know whether a GSA action is from the Army or the Air Force. An unscientific survey of purchasing activity coding manuals identified 14 purchasing activities with identical four-character codes for the Army and the Air Force. The Navy uses five letters and numbers to identify purchasing activities; there is therefore no overlap with Navy purchasing activities.

For these reports all GSA supply schedule actions are coded "G" and are separated from the purchasing activity. The definition of competition used in these reports defines GSA supply schedule purchases as noncompetitive. Removing GSA supply schedule purchases would cause competitive rates for some purchasing activities to be slightly overstated.
### TABLE A-2. DEFINITION OF MILITARY DEPARTMENT VARIABLE

<table>
<thead>
<tr>
<th>FIRST 3 CHARACTERS OF CONTRACT NUMBER</th>
<th>DEPT</th>
<th>MILITARY DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAx</td>
<td>A</td>
<td>Army</td>
</tr>
<tr>
<td>Nxx</td>
<td>N</td>
<td>Navy</td>
</tr>
<tr>
<td>Fxx</td>
<td>F</td>
<td>Air Force</td>
</tr>
<tr>
<td>Mxx</td>
<td>M</td>
<td>Marine Corps</td>
</tr>
<tr>
<td>DLA</td>
<td>D</td>
<td>Defense Logistics Agency</td>
</tr>
<tr>
<td>DCA</td>
<td>O</td>
<td>Defense Communications Agency</td>
</tr>
<tr>
<td>DMA</td>
<td>O</td>
<td>Defense Mapping Agency</td>
</tr>
<tr>
<td>DNA</td>
<td>O</td>
<td>Defense Nuclear Agency</td>
</tr>
<tr>
<td>MDA</td>
<td>O</td>
<td>Miscellaneous defense agencies</td>
</tr>
<tr>
<td>GSx</td>
<td>G</td>
<td>GSA supply schedule</td>
</tr>
</tbody>
</table>

### FIGURE A-3. GENERATING THE "DEPT" VARIABLE

```
/*Y LIST
1   DI JOB (WXY1.778,C).DJSP
2   /*PROCLIB DD DSN=ZASCRUN PROCLIB,DISP=SHR
3   /*EXEC SAS
4   /*PRM DD UNIT=FILE,DISP=SHR,VOL=SER=CNTL40.
5   /*DSN=WXY:UDI PRM DATA
6   /*OUT DD UNIT=FILE,DISP=(NEW,CATLG).
7   /*VOL=SER=CNTL27,DSN=WXY:UDI DATA1.
8   /*SPACE=(CYL,(40,1))
9   /*ZYSIN DD *
10  DATA OUT DATA1.
11  SET CRM DATA.
12  OPTIONS NOCENTER.
13  DEPT = 'O'.
14  IF SUBSTR(CONUM,1,1) = 'N' THEN DEPT = 'N'.
15  IF SUBSTR(CONUM,1,1) = 'F' THEN DEPT = 'F'.
16  IF SUBSTR(CONUM,1,1) = 'M' THEN DEPT = 'M'.
17  IF SUBSTR(CONUM,1,2) = 'DA' THEN DEPT = 'A'.
18  IF SUBSTR(CONUM,1,2) = 'DL' THEN DEPT = 'D'.
19  IF SUBSTR(CONUM,1,2) = 'GS' THEN DEPT = 'G'.
```
A variable named "COMP" was also generated to denote the competitive status of each action. Competitive actions are denoted "COMP" = 1, and noncompetitive actions are described as "COMP" = 0. Competitive actions are those using formal advertising, price competition, or design and technical competition. Modifications and follow-ons are denoted noncompetitive. Figure A-4 is the SAS code that computes the competition variable.

FIGURE A-4. GENERATING THE "COMP" VARIABLE

```sas
LISTLO
1  //UDI JOB (WXY1,778,C), DJSP
2  //PROC LIB DD DSN=ZASCRTN.PROCLIB, DISP=SHR
3  // EXEC SAS
4  //PRM DD UNIT=FILE, DISP=SHR, VOL=SER=CNML23,
5  // DSN=WXY1UD1.DAT
6  //OUT DD UNIT=FILE, DISP=(NEW,CATLG),
7  // VOL=SER=CNML23, DSN=WXY1UD1.DAT
8  // SPACE=(CYL,(40,1))
9  //SYSIN DD *
10  DATA OUT.DAT;
11  SET PRM.DAT;
12  COMP=0;
13  IF (KIND='1' OR
14     KIND='2' OR
15     KIND='3' OR
16     KIND='4' OR
17     KIND='5' OR
18     KIND='6') AND
19     (METH=1 OR
20     EXTCOM=1 OR
21     EXTCOM=2) THEN COMP=1;
22  DROPCONUM,
23  PROC CONTENTS DATA=OUT.DAT;
```

DATA FILE CREATION

A separate data file is created to produce Report No. 1, Federal Supply Class (FSC) Competitive Rate. This file contains five variables for each FSC code: (1) the FSC code itself, (2) the number of noncompetitive actions, (3) the value of noncompetitive dollars, (4) the number of competitive actions, and (5) the value of competitive dollars. Figure A-5 shows the SAS code to create this file.
Next, the competitive dollars are added to the noncompetitive dollars to produce the total dollars obligated for each FSC. The totals are used to compute the percentage competitive for each FSC, which is also stored on the file. This program is shown in Figure A-6. From this point on, a test file was used to save time and because it was necessary to illustrate only the format of the reports.

Several of the earlier procedures required up to 40 seconds of central processing unit time to process the complete DD 350 data base. Procedures on the test file generally required less than one second to execute.

REPORT CREATION

The next step is to create the format for Report No. 1. A special library is established with the FSC code and a description of the commodity. All the programs which produce reports will access this
library. Figure A-7 shows how this library was created. There are approximately 2,500 FSC codes in the library. DoD used about 1,000 of the codes for actions in FY 1984. Figure A-8 displays the code that creates and prints the first report.

The FSC percentage competitive rates will be used to produce Report No. 2, Purchasing Activity Performance Summary. The result is an anomalies ratio for each activity, comparing the activities' competitive achievements with the overall DoD competitive achievements. Figure A-9 shows the SAS code to produce the second report. It is quite similar to the code for the FSC report, but more complicated because calculations are performed separately for each activity.

Report No. 3 ranks activities by anomalies ratio. Figure A-10 is the program that calculates and saves the four variables required for the anomalies ranking: service, purchase activity, total dollars obligated, and anomalies ratio. The program sorts the file on the basis of the anomalies ratio and assigns a rank. Figure A-11 is the SAS code that generates the report.
FIGURE A-7. CREATING THE FORMAT LIBRARY FOR FSC CODES

```sas
/*L 1/25
  //UDI JOB (WXY1,778.A),DJSF
  //PROC LIB DD DSN=ZABCRUN.PROCLIB, DISP=SHR
  // EXEC SAS
  //SASLIB DD UNIT=FILE, DISP=(NEW.CATLG), VOL=SER=FILE40,
  //   DSN=WXY1UDI.FORMAT, SPACE=(TRK,(5,1,1))
  //SYSIN DD *
  PROC FORMAT DDNAME=SASLIB;
  VALUE $FSC
     AA11 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA12 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA13 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA14 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA15 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA16 = 'RDT/E INSECT AND DISEASE CONTROL'
     AA21 = 'RDT/E AGRICULTURE MARKETING'
     AA22 = 'RDT/E AGRICULTURE MARKETING'
     AA23 = 'RDT/E AGRICULTURE MARKETING'
     AA24 = 'RDT/E AGRICULTURE MARKETING'
     AA25 = 'RDT/E AGRICULTURE MARKETING'
     AA26 = 'RDT/E AGRICULTURE MARKETING'
     AA31 = 'RDT/E AGRICULTURE PRODUCTION'
     AA32 = 'RDT/E AGRICULTURE PRODUCTION'
     AA33 = 'RDT/E AGRICULTURE PRODUCTION'
     AA34 = 'RDT/E AGRICULTURE PRODUCTION'
     AA35 = 'RDT/E AGRICULTURE PRODUCTION'
     AA36 = 'RDT/E AGRICULTURE PRODUCTION'
```

A-9
Fig. A-8. FORMATTING INSTRUCTIONS FOR THE FSC SUMMARY REPORT

/*
  1    //UDI JOB (WXYL.778.A).DJSF
  2    //PROC LIB DD DSN=ZABCRUN.PROCLIB.DIS=SHR
  3    // EXEC SAS
  4    //SABLIB DD UNIT=FILE.DIS=SHR.VOL=SER=FILE40.
  5    // DSN=WYLIU FORMAT
  6    // PRM DD UNIT=FILE.DIS=SHR.VOL=SER=FILE40.
  7    // DSN=WYLIU SUMMARY
  8    // SYSIN DO *
  9    DATA _NULL_;
 10    SET PRM.SUMI END=EOF;
 11    FSCNAME=FSC;
 12    IF _TYPE_=-0 THEN DO;
 13           DENOM=TDOIL;
 14         RETAIN DENOM;
 15   END;
 16    DATE=DATE();
 17    FILE PRINT HEADER=N NOTITLES;
 18    IF _TYPE_=1 THEN DO;
 19           PCOF-TDOIL/DENOM;
 20         FORMAT FSCNAME $FSC.
 21     PUT @1 FSC #4 @6 FSCNAME $FSC. @31 TNUM 4 @39 TDOIL COMMA13
 22          @75 PCOF 6 2 @87 CNUM 4. @94 TDOIL COMMA12. @013 CRATE 7 2;
 23    TOTNUM = TNUM;
 24    TOTDOL+TDOIL;
 25    TCNUM+CNUM;
 26    TOTCDOIL+TDOIL.
 27   END;
 28    IF EOF THEN DO;
 29      TCRATE=TOTCDOIL/TOTDOL;
 30      TOTPC=TOTDOL/DENOM;
 31     PUT @1 'TOTAL' @32 TOTNUM 4 @39 TOTDOL COMMA13
 32          @75 TOTPC 6 2 @87 TCNUM 4. @94 TOTCDOIL COMMA13
 33     @013 TCRATE 7 2;
 34   END;
 35    RETURN;
 36    H PAGER=1. PUT @115 'PAGE' PAGER
 37 1 /@115 DATE MMDDYYB
 38 2 /@115 'LM'
 39 3 / @35 'COMPETITIVE CONTRACTING REPORT'
 40 /@64 'FSC SUMMARY'
 41 /@36 'ALL DOD - FY84'/
 42 /@950 'NUMBER' @64 'TOTAL' @75 'PERCENT'
 43 @38 'NUMBER' @39 'COMPETITIVE' @114 'FSC'
 44 /@952 'OF' @63 'DOLLARS' @76 'OF' @90 'OF'
 45 @100 'DOLLARS' @114 'PERCENT'
 46 /@50 'ACTIONS' @62 'OBLIGATED' @74 'TOTAL'
 47 @64 'COMPETITIVE'
 48 @99 'OBLIGATED' @112 'COMPETITIVE'
 49 /@31 'FSC' @7 'PRODUCT OR SERVICE'
 50 @93 '(1000)' @98 'ACTIONS' @100 '(1000)
 51 /@147 ' ' @50 '32 ' @86 '38 ';
 52 RETURN.

A-10
FIGURE A-9. FORMAT INSTRUCTIONS FOR PURCHASING ACTIVITY PERFORMANCE SUMMARY

A-11
FIGURE A-10. CREATING THE DATA FILE FOR THE ANOMALIES RANKING

```sas
LIBRARY JOB (WXY1778.A).DSN=ZABCRUN.PROCLIB.DISP=SHR
/EXEC SAS
/PRCLIB DD DSN=ZABCRUN.PROCLIB.DISP=SHR
/PRM DD UNIT=FILE.DISP=SHR.VOL=SER=FILE40.
/DSN=WXY1UDI SUMOFSC4
/OUT DD UNIT=FILE.DISP=(NEW.CATLG).VOL=SER=FILE40.
/DSN=WXY1UDI RATIO.SPACE=(TRK,(4,1))
/SYSIN DD *

DATA OUT.RATIO;
SET PRII SUMOFSC4 ;
BY DEPT PURCH FSC;
KEEP _TYPE_ DEPT PURCH TOTDOL ANOM;
IF _TYPE_=0 THEN DO;
   DENOM=TOTDOL;
   RETAIN DENOM;
END;
IF FIRST PURCH THEN 00;
TOTNU=T0;
TCNUM=T0;
TOTCDOL=T0;
TWTO=T0;
TWTD=T0;
END;
IF _TYPE_=1 THEN DO;
PCOFT=TOTDOL/DENOM;
OFCPC=CDOL/TDOL;
WTFCO=PCOFT*OFCPC;
WTFCD=PCOFT*CRATE;
TWTO+WTFCO;
TWTD+WTFCD;
TOTNUM+TNUM;
TOTDOL=TDL;
TCNUM+CNUM;
TOTCDOL+CDOL;
IF LAST PURCH THEN DO;
TPCFC=TOTCDOL/TOTDOL;
TPCOFT=TOTDOL/DENOM;
IF TWTD=0 THEN ANOM=0;
ELSE ANOM=TWTO/TWTD;
END;
END;
PROC SORT DATA=OUT.RATIO.
BY DESCENDING ANOM.
PROC PRINT DATA=OUT.RATIO.
```

A-12
FIGURE A-11. FORMATTING INSTRUCTIONS FOR THE ANOMALIES RANKING REPORT

```sas
/*
  //UDI JOB (WXY1,778.A).DSF
  //PROCLIB DD DSN=ZABCRUN PROCLIB,DISP=SHR
  // EXEC SAS
  //SASLIB DD UNIT=FILE,DISP=SHR,VOL=SER=FILE40.
  //DSN=WXY1UDI FORMAT
  //PRM DD UNIT=FILE,DISP=SHR,VOL=SER=FILE40.
  //DSN=WXY1UDI RATIO
  //SYSIN DD *
  DATA _NULL_
  SET PRM RATIO.
  FORMAT DEPT ISERV.
  DATE=DATE();
  IF ANOM NE
  FILE PRINT HEADER=* NOTITLES,
  PUT @5 _N_ 3 @10 PURCH 15 @16 DEPT 1$SERV.
  927 TOTDOL COMMA13 @41 ANOM ? 3.
  RETURN.
  H PAGER=1.
  PUT @115 'PAGE ' PAGER / @115 DATE MMDDYY8 / @115 'LMI'
  / @13 'COMPETITIVE CONTRACTING REPORT'
  / @14 'ANOMALIES RATIO RANKING'
  / @16 'ALL DOD - FY84'
  / @26 'DOLLARS'
  / @27 'OBLIGATED' @41 'ANOMALIES'
  / @5 RANK @10 'OFFICE' @18 'SERVICE'
  / @28 '(000)' @43 'RATIO';
  RETURN.
*/
```

A-13
Department of Defense policy states that goods and services are to be acquired competitively whenever possible. This study describes management information reports to assist in increasing competition in DoD contracting. The reports use data reported on the Individual Contracting Action Report (DD Form 350) which covers all actions over $25,000. The proposed reports generate an "anomalies ratio" for each purchasing activity in DoD. The anomalies ratio compares an activity's actual competitive rate to its anticipated competitive rate where the anticipated rate is based on the average DoD competitive performance for each type of item the activity buys. A test of the proposed reports was conducted with the cooperation of the competition advocates of the Military Departments. Use of the reports is recommended to encourage increased competition in DoD.
END
10-86
DTIC