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Michael J Peters

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SMC / FMCL
Los Angeles AFB, CA 90009-2960

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COST IMPACT of DoD BUDGET REDUCTIONS

by
Michael J Peters
Air Force Cost Analysis Agency

20 July 1993

I. INTRODUCTION

Increased unit costs resulting from reductions in Department of Defense (DoD) procurement are the major cost drivers in the current and future acquisition of weapons systems. This finding was initially reached in the Independent Cost Estimate (ICE) conducted on the Titan IV Program by the Cost Analysis Division of the Air Force Space & Missile Systems Center. The estimating team commenced its efforts in October 1991 and submitted its report in August 1992. Similar findings have been reached in estimates developed for the following programs: F-22; Milstar; Inertial Upper Stage; and Defense Meteorological Satellite Program. The conclusions drawn from these analyses are that the impact of DoD procurement reductions: results in a 10-15% increase in program cost; affects all major defense programs; and is long term. It is recommended that: DoD should reevaluate its understanding of this phenomenon: review the coordination of government agency oversight on indirect cost expense; and estimate and review program cost from a total cost perspective.

II. DISCUSSION

Early into the Titan IV ICE, the estimating team found indications of increased cost attributable to DoD program reductions in the business base of Martin Marietta, the prime contractor, and its major element subcontractors. In the final analysis, the team attributed an 11.6% increase in total program cost to this phenomenon. An unrelated study conducted in 1992 by the Defense Management Contract Command identified a similar impact to the F-22 Program. The impact was attributed to reductions in the business base of Boeing, the prime contractor, and its major subcontractors. Based on this information, the Office of the Comptroller at the Air Force Space & Missile Systems Center opted to include a business base impact analysis as part of all major estimates. To date that analysis has been conducted on the Milstar, Inertial Upper Stages, and Defense Meteorological Satellite Programs. These analyses have included reviews at on-site locations of 22 major defense contractors (atch 1).

All contractors reviewed are experiencing significant reductions in their revenue generating business base and are realizing higher operating cost per unit of production. The analysis found the factors contributing to the cost increases to be

PROGRAM IMPACTS DUE TO BUSINESS BASE REDUCTIONS
A PROCESS FOR ANALYSIS AND CONTROL

The presentation describes an analysis of cost impact resulting from reductions in contractor business base and the process that has evolved at the Air Force Space & Missile Systems Center to identify and control those impacts at the program level.

In October 1991, the team conducting an Independent Cost Estimate (ICE) on the Titan IV Program determined that reductions to contractor business base could be a major cost driver. This resulted in a dedicated analysis to quantify those cost impacts. The identified impact was significant and resulted in a determination to apply the same analysis to major estimates conducted at Space & Missile Systems Center. To date it has been applied to the Milstar, DMSP and IUS Programs. Data collection has been conducted at 22 contractor locations (see attached). The process involves: analysis of prior and current contractor forward pricing documents; analysis of the current and future contractor business profile; identification of fixed and variable cost drivers; quantification of potential program dollar impact; and identification of control mechanisms. The process offers an efficient and effective means of making a realistic assessment of a critical cost factor.

Michael J. Peters
SMC/FMCL
Los Angeles AFB, CA 90009-2960
(310) 363-1774
DSN 833-1774
FAX (310) 363-3518

consistent in varying degrees at all contractors reviewed. These factors are: direct labor rates; indirect expense rates; production inefficiencies; and vendor loss. The analysis also noted a significant occurrence of contractor accounting system changes. These did not contribute to the cost increase, but did tend to distort the data base and the ability to accurately measure the impact of the cost increase. The following details the nature of the factor impact:

Direct Labor Rates are increasing due to the nature of work force reductions resulting from the erosion of the business base. Within functional labor categories, terminations tended to occur at the lower end of the wage scale. This is due to attempts to retain skilled employees who tended to be more senior and higher paid and/or a function of union agreements which generally operate on a last in/first out principal also favoring more senior, higher paid employees. The net impact is an increase to the average direct labor rate above the normally anticipated escalation that is being applied to government contracts. The increase is in the range of 1 1/2 - 4 1/2%.

Indirect Expense Rates are increasing due to the semi-variable and fixed nature of indirect expenses. Contractor indirect cost reductions are not occurring at the same rate relative to direct cost reductions. Because of the semi-variable and fixed nature they generally lag behind direct cost reductions or reach a floor beyond which reductions can not be accomplished without impairing the ability to accomplish the required function. The analyses found clear indication of this in several areas. The indirect/direct labor expense ratio is increasing. Contractors are also finding limited markets for disposing of excess plant and equipment acquired to support the defense build-up that occurred in the 1980's. Environmental liability is prevalent and, because cleanup tends to be government mandated and defined, it is a fixed cost. Pension liability, also fixed, is doubly impacted by a declining contributor base due to labor reductions and a reduced investment return due to declining interest rates. Per capita medical cost continues to increase regardless of significant efforts at control. The impact of the individual factors tended to vary with contractors depending on the nature of the product and their dependence on DoD business. Attachment 2 depicts the relative nature of the impact on a sample of the contractor group analyzed. This chart depicts the percentage increase from a 1991 base year. By way of example, a fiscal year 1994 (FY94) cost estimate derived from a 1991 data base for contractor 4 would have to be increased by a factor of 6.6% to compensate for the

impact.

Production Inefficiencies are occurring with the production slowdown of existing programs or the cancellation of similar programs. Today's complex weapons systems require that contractors maintain a core work force with a variety of specialized skills. Workload is diminishing but the core requirement still exists and these employees are being under-utilized. Production efficiencies attributable to learning are also diminished in this environment. Though this impact was consistently observed, it was not directly quantified other than to recognize it as an element of risk to the future cost of production.

Vendor Loss is occurring at lower tier subcontractor levels. It reflects contractors who can no longer being sustained by DoD business. These firms are generally specialized in terms of work force and capital equipment and have little or no expertise in the commercial market place. The loss of these firms does not necessarily reflect skill loss. They are generally being absorbed or, in some cases, subsidized by prime contractors. This is being done at additional cost to contract. During the analysis, several examples were noted of subcontractors who had advised prime contractors of a price which they simply would not go below. While not observed, it is assumed that the potential for such loss is significant at very low subcontractor levels. This factor was also considered as an element of risk and was not quantified.

Accounting System Changes were not considered to be a factor contributing to increased cost. These changes do, however, tend to complicate the task of comparative analysis with a prior year data base. The general trend is to convert indirect expense to a direct category. Government Cost Accounting Standards (CAS) allow the latitude to make such changes. The analysis noted direct labor rate increases of 22% and 26% at two major aerospace contractors as a result of accounting changes. These changes do produce a downward adjustment in overhead rates. The adjustment is not generally commensurate with the increases in direct labor rates because of the factors noted above. These changes, thus, make actual overhead increases difficult to ascertain. It may also give a false sense of security by implying that the contractor is controlling overhead rates as evidenced by rate reductions.

As noted above, the analyses revealed program cost impacts ranging from 10-15%. The range variance is reflective of the varying ability of contractors to cope with the current

environment. Some contractors reviewed appeared to have better anticipated the current environment. Others appeared to be assuming "business as usual" with the anticipation that government spending would be redirected to alleviate its problems. The impact is also a function of the timing and scope of the business base reductions. Some contractors are now just beginning to realize the impact of the reductions and in varying degrees. Attachment 2 illustrates the varied nature of the impact by comparing increases between specific contractors.

The impact is considered to be universal. As noted above, 22 contractors covering a wide spectrum of the DoD contractor community were reviewed (atch 1). In all cases, a significant impact could be discerned. To ascertain impact, discussions were held with contractor business management personnel and resident government employees at the contractor location. The reviewer had access to indirect and direct forward pricing rate documents, both current and prior year; contractor documentation supporting projections for: direct labor rates by functional category; overhead expenses by expense element; and business base projections by service and program. The reviewer also had access to internal government documents regarding anticipated government acquisition strategy. These were invaluable in ascertaining the reliability of contractor business base projections.

The trend is long term. Discussions with contractor business management personnel indicated that they are vigorously attempting to reduce cost. Many have defined target goals. One contractor indicated a goal of a 30% reduction in overhead cost. With closer scrutiny it was determined that this was a "management challenge" with no objective basis and naive assumptions. One strategy referred to reducing facilities. The local real estate market is, however, already glutted and high vacancy factors exist for the types of facility that the contractor is trying to divest. The dilemma for most contractors is that much of the cost load is reflected in embedded cost such as excess facilities, environmental liabilities, pension expense and medical cost which have no near term solutions. These embedded costs are tied to bloated organizational structures which are not easily overhauled. Recent examples of the dilemma are the U. S. steel and auto industries which required almost two decades to regain a competitive posture. It should be noted that the phenomenon is exacerbated through industrial base protection programs which subsidize inefficient contractors.

DoD requires a more realistic understanding of the current phenomena and needs to factor the cost impact into current projections. The DoD acquisition community does not fully appreciate the semi-variable and fixed nature of indirect program cost. There appears to be an assumption that as direct program cost is reduced so will other related cost. It is assumed that contractors have much greater latitude to cope with such cost than

is reality. This reality must be recognized and program managers should factor in resultant cost increases when they can be substantiated through analysis. The approach described above has proven to be both an effective and efficient means of analyzing impact. It requires an individual who has an understanding of: cost estimating; forward pricing rate development; and contractor accounting practices. It can be accomplished within a period of one to two weeks. This approach also provides a means of identifying those factors which should be monitored for possible cost control.

A better understanding of overhead oversight mechanisms is required coupled with better coordination among affected agencies. DoD acquisition managers seem not to have a clear understanding of the oversight mechanisms which affect overhead rates. This role falls to a single analyst at the resident Defense Plant Representative Office (DPRO). The job is generally beyond the skills of the analyst. Program managers also attempt to negotiate contract specific rates without consulting with the DPRO analyst. When successful, they confuse the issue for the DPRO analyst and adversely impact cost to other government contracts. The role of the DPRO analyst should receive greater emphasis. The DPRO analyst should be integrally involved in program contract negotiations and should be regularly consulted as to the status of the contractor's forward rate pricing posture. The DPRO analyst should seek to involve representatives from the major government programs supported by the contractor when developing and negotiating a position on forward pricing rates. This concerted approach serves to enhance the government's generally fragmented posture in accomplishing cost control.

Programs need to be reviewed from a total cost perspective. Program estimates are developed by a technical cadre which focuses primarily on direct effort. Overhead rates which can add 50% or more to the total cost are simply applied as a factor with little consideration for the direct cost relationship or the potential pitfalls in the future. These rates are generally the effort of one individual, the DPRO analyst. That individual rarely participates directly in the cost estimate. The current system simply leaves to much room for error.

III. CONCLUSIONS

In summary, the following is concluded:

- Reductions in DoD spending are increasing anticipated program cost by a factor of 10-15%;

- The factors considered responsible for the increased costs are occurring at all contractors sampled and indicate that the phenomena is universal to the DoD contractor population;

- The factors considered responsible are not susceptible to immediate resolution and the phenomena is considered to be long term.

IV. RECOMMENDATIONS

The following actions are recommended:

- Analysis should be performed as described above to determine potential impact to program cost;

- Program offices should become familiar with those government agencies responsible for contractor cost control oversight and actively support those oversight efforts;

- Program offices should become more familiar with the direct/indirect cost relationship and should conduct program cost analysis from a total cost perspective.

BUSINESS BASE ANALYSIS

SCOPE

- **TITAN IV ICE**
  - Martin Marietta
  - Chemical Systems
  - Aerojet
  - Hercules
  - General Dynamics
  - McDonnell Douglas
  - Pratt & Whitney
  - Honeywell
  - Cincinnati Electronics
  - Moog
  - SCI
- **ADDITIONAL**
  - Lockheed
  - TRW
  - Hughes
  - Boeing
  - GE Aerospace
  - Hamilton Standard
  - ITT
  - Harris
  - Westinghouse
  - IBM
  - Bechtel

BUSINESS BASE ANALYSIS
COMPOSITE FACTOR DIFFERENTIAL

CONTRACTOR	EXPERIENCE												
contractor 1	1.132	1.278	1.358	1.439	1.241	1.288	1.321	1.330	1.325	1.302	1.311	1.315	1.316
contractor 2	1.008	1.041	1.033	1.033	1.024	1.033	1.033	1.033	1.033	1.033	1.033	1.033	1.033
contractor 3	1.058	1.069	1.069	1.075	1.058	1.063	1.069	1.069	1.063	1.063	1.063	1.063	1.063
contractor 4	1.072	1.076	1.066	1.038	1.048	1.060	1.060	1.054	1.054	1.054	1.054	1.054	1.054
contractor 5	1.131	1.105	1.080	1.105	1.098	1.083	1.099	1.096	1.096	1.096	1.096	1.096	1.096
contractor 6	1.045	1.045	1.048	1.023	1.028	1.034	1.034	1.034	1.028	1.034	1.034	1.034	1.034
contractor 7	1.053	1.121	1.121	1.111	1.105	1.100	1.111	1.111	1.111	1.111	1.111	1.111	1.111
contractor 8	1.067	1.058	1.065	1.081	1.088	1.077	1.077	1.081	1.081	1.081	1.077	1.081	1.081
contractor 9	1.098	1.096	1.150	1.192	1.108	1.128	1.132	1.144	1.138	1.132	1.132	1.138	1.138
contractor 10	1.060	1.075	1.071	1.075	1.075	1.069	1.065	1.060	1.060	1.068	1.068	1.060	1.060

Attachment 2