

# **Long-Run Costs and Performance Effects of Competitive Sourcing Program: Profiles of 16 Competitions**

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A handwritten signature in black ink, appearing to read 'Alan J. Marcus', with a horizontal line extending to the right.

Alan J. Marcus, Director  
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## Summary

This document profiles 16 competitive sourcing competitions conducted by the Department of Defense (DoD) between 1988 and 1996. We analyzed these competitions to determine whether the savings that were identified at the time of completion actually materialized without affecting the quality of the services provided.

The document consists of 17 sections—a summary and a section profiling each competition. Each profile summarizes the costs and performance characteristics of the competition. Appendix A describes the methodology we used to develop the cost and performance data. A separate report, *Long-run Cost and Performance Effects of the Competitive Sourcing Program*, provides a complete analysis of the 16 competitions profiled here.

## Background

Between FY 1997 and FY 2005, DoD plans to compete roughly 203,000 of the full-time positions (FTEs) in which people are performing commercial functions. This effort, which is part of DoD's competitive sourcing program, was begun in FY 1997. The Department estimates that it will save roughly \$9.2 billion in operating costs during that period, and \$2.8 billion in annual recurring savings after FY 2005. These savings will help fund modernization and improve readiness.

The Department needs to know whether these savings targets are realistic. Past reviews of the competitive sourcing program conducted by CNA and other organizations have estimated that the program saves 30 percent or more of the pre-competition cost of performing the function. However, there is some concern that these estimated savings may not materialize; that they cannot be sustained over time; and that, if savings are achieved, quality of performance will suffer.

Therefore, at DoD's request, we undertook a study of the long-run cost and performance effects of the competitive program.

## **Purpose**

This study addresses DoD's concerns and examines whether the expected level of savings can be achieved and maintained over the long-run without affecting the quality of services provided. To accomplish this, we answer the following questions:

- Are the savings from competitive sourcing real?
- Are the savings sustained over time?
- Is the post-competition performance satisfactory?

## **Summary of competitions**

To look at these cost and performance issues, CNA examined 16 competitions completed between 1988 and 1996. We chose this time period because it provides sufficient time to determine whether the savings estimated at the time of the competition materialized and were sustained over time. Table 1 lists the competitions and provides summary data on their service affiliation, size, and dollar value and whether they were in-house or contract wins.

Table 1 shows that the competitions consisted of 14 contract wins and 2 in-house wins. The 16 competitions represented roughly 2,800 FTEs or billets, or 15 percent of the FTEs/billets competed between 1988 and 1996. Annual pre-competition costs for these functions totaled roughly \$100 million. Eleven of the competitions were conducted by the Air Force, three by the Army, and two by the Navy. These 16 competitions represented the major functions available for competitive sourcing, including such functions as supply/logistics, facility and family housing maintenance, and aircraft maintenance.

The competitions ranged in size from 23 to almost 1,000 FTEs/billets. The average size of a competition was 178 FTEs/billets, and the median size was 40, which tells us there are a significant number of small competitions. We had at least 3 years of data for each of the 16 competitions, and for the 9 completed before 1992, we had at least 8 years of data.



Table 1. Summary data on 16 competitions

Record	Function	Service	Annual baseline	Military billets	Civilian FTE's	Result
1	Supply/Logistics	Army	17,687,482	73	524	Contract
2	DPW/Family Housing Maintenance	Army	11,410,072	3	248	Contract
3	Visual Information Services	Army	3,572,664	7	72	Contract
4	Base Operating Support	Air Force	11,807,125	205	72	In-House
5	Grounds Maintenance	Air Force	1,026,437	–	31	Contract
6	Aircraft Maintenance	Air Force	28,703,925	853	126	In-House
7	Base Operating Support	Air Force	10,264,890	177	101	Contract
8	Grounds Maintenance	Air Force	903,059	–	28	Contract
9	DPW/Family Housing Maintenance	Air Force	2,234,118	–	45	Contract
10	Grounds Maintenance	Air Force	1,139,500	–	34	Contract
11	DWP/Family Housing Maintenance	Air Force	1,328,338	1	30	Contract
12	DPW/Family Housing Maintenance	Air Force	2,860,295	–	27	Contract
13	Aircraft Maintenance	Air Force	2,069,450	12	21	Contract
14	Vehicle Ops and Maintenance	Air Force	3,382,846	65	34	Contract
15	Supply/Logistics	Navy	945,667	–	33	Contract
16	Supply/Logistics	Navy	668,533	–	23	Contract
Total			100,004,401	1,396	1,449	

## Methodology

We reviewed all available documentation on the cost and performance of the function; interviewed base personnel representing management, contracting, and customers; and obtained supplementary data such as audit reports, private sector cost data on comparable functions, and relevant workload data when available. We also examined the extent to which management, customers, and contracting officers were satisfied with the resulting performance. A complete description of the methodology is provided in appendix A. We conducted our analysis between August 1999 and July 2000.

## Costs

For the 16 competitions included in our analysis, we collected actual costs and all available performance information from the time of competition through FY 1999. To evaluate whether savings were sustained over time, we calculated the *expected* level of savings for each

competition (based on the difference between the pre-competition costs and the winning bid) and compared these savings estimates with the post-competition costs under two scenarios. The *expected* savings are the estimated savings that are identified at the completion of an A-76 competition.

First, we looked at *observed* costs, or what was actually spent by DoD for the provision of services, for each year after the competition. Observed costs include any increases or decreases in costs that result from changes in scope, workload, wages, and one-time cost adjustments.

Next, we looked at *effective* costs, or the cost to DoD of providing the *same set* of services as originally identified in the cost comparison. Effective cost estimates exclude cost changes that would have occurred whether or not the function was competed. For example, in one competition the *observed* costs of providing services increased by over 15 percent from 1991 to 1992. This increase was due to additional workload needed to support our military in the Persian Gulf. This type of increase in workload, and therefore cost, would have occurred no matter who provided the necessary services, be it a contractor or in-house labor. Therefore, the *effective* costs for 1992 would be adjusted to remove these one-time costs. By adjusting the data to exclude this type of workload, scope, wage, and one-time costs, effective cost estimates allow us to compare changes in cost while keeping the original scope constant. Comparing *effective* and pre-competition costs provides insight into true cost growth.

During the course of our analysis, we had to make some assumptions in isolating such factors as the effects of scope or workload changes, the amount of contract administration or augmentation of contract labor by government labor, or minor discrepancies between authorized and expended funds. In all cases, we chose to be conservative and decided in favor of the alternative that would limit rather than increase savings.

## **Performance**

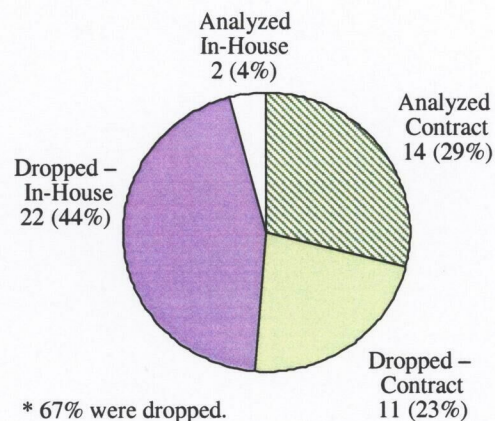
For the 16 competitions included in our analysis, we conducted on-site interviews to determine the extent to which customers, management, and contracting officers are satisfied with post-competition per-

formance. During the interviews, we asked the participants to rank performance on a scale of one to five, with one being dissatisfied, three being neutral (neither satisfied or dissatisfied), and five being satisfied. We supplemented the interviews with a review of performance-related data in contract and other files. We also obtained additional data such as audit reports and data from Service-wide information systems to augment the data we collected on site.

## Problems with data collection

Our original intention was to examine a balanced number of in-house and contract wins, and, to that end, we had selected 49 competitions for potential review. However, we had to eliminate about two-thirds of that number because of insufficient and missing data. Figure 1 displays the distribution of the original 49 competitions and the 16 competitions that we ultimately analyzed. As we see in figure 1, data problems were particularly apparent for in-house wins. Of the 24 in-house wins originally identified for analysis, only 2 had the data we needed to complete the analysis.

Figure 1. Distribution of 49 original competition methodologies



We had originally planned to examine at least 30 competitions, won both by in-house and contract; however, insufficient or inadequate data limited the number to 16. Our intent was to be able to review the

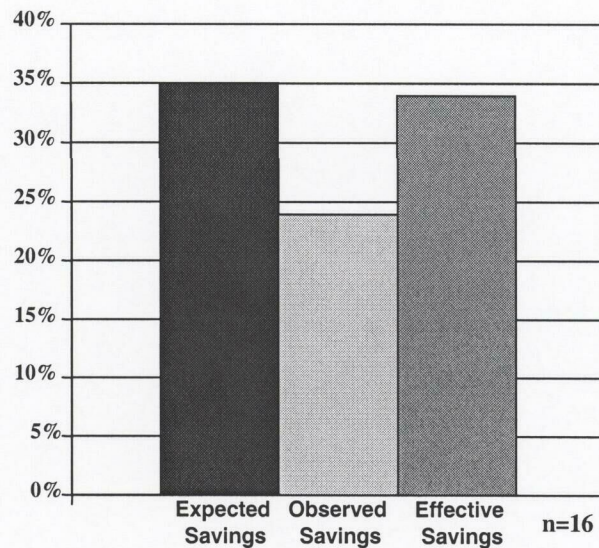
actual costs to perform these functions for at least the performance period specified in the competition.

## Results of our analysis

### Long-run savings are real and are sustained over time

For the sample of 16 competitions, our analysis indicates that the savings achieved from competition are sustained over time. The expected savings for this group was 35 percent for the first solicitation period, with an effective savings rate of 34 percent (indicating that savings are not degrading over the first solicitation period). Even with all wage, scope, and workload changes included in the cost analysis, a substantial level of observed savings (24 percent) is realized. These savings appear to continue through subsequent solicitation periods. Figure 2 summarizes these savings.

Figure 2. Summary of savings

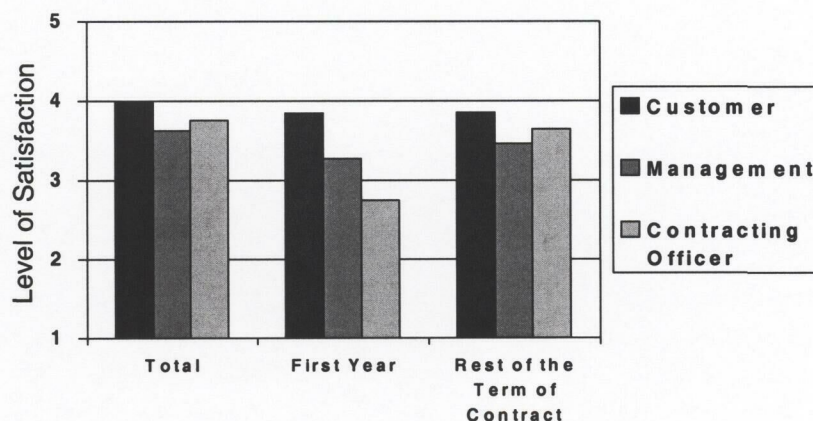


## Performance is satisfactory

For the 16 competitions included in our analysis, we conducted interviews to determine the extent to which customers, management, and contracting officers are satisfied with post-competition performance. On a scale of one to five, with one being dissatisfied, three being neutral (neither satisfied nor dissatisfied), and five being satisfied, on average, overall performance was ranked between neutral and satisfied.

Performance levels tended to be lower during the first year, particularly if tensions created during the competition continued into contract performance, or if the transition proved to be more difficult than expected. On average, customers were more satisfied with performance than were management and contracting officers. Performance data are summarized in figure 3. Grounds maintenance was the only function that received unsatisfactory performance ratings. This accounted for less than 5 percent of the competitions' total dollar value, and the bases in question have taken steps to correct the problem.

Figure 3. Summary of performance



## **Organization of document**

The remainder of this document profiles the 16 competitions that we reviewed. Each section describes a separate competition. It summarizes the size and scope of the competition, describes the level of savings achieved, and summarizes the base representatives' view of post-competition performance. An appendix describes the methodology used in our analysis.

# **Base Operations Support: Laughlin AFB (F0JMXDP83)**

## **Background**

The Air Force first announced the competition of base operations support (BOS) at Laughlin AFB on April 9, 1992. The competition was to cover the base's motor vehicle operation and maintenance, facilities maintenance, and supply operations. The motor vehicle portion of the activity also covered fuels; the facilities maintenance included all of the maintenance and repair shops doing building maintenance. Pieces of motor vehicle operations and maintenance that had already been contracted were rolled into the BOS contract as the individual contracts expired.

The original in-house organization expended 398 work-years to perform these activities—185 civilian work-years and 213 military work-years. Before the competition began, however, the in-house organization was reduced to 278 work-years—101 civilian work-years and 177 military work-years. The most efficient organization (MEO) included 187 civilian work-years—the number of billets authorized in the unit manning document (UMD). The solicitation was firm fixed price and restricted to small disadvantaged businesses. Deductions to the firm fixed price are taken if the contractor fails to perform in accordance with the contract. Typically, these deductions to this contract don't exceed 5 percent of the monthly payment. Six private sector firms responded to the solicitation.

The preliminary decision was to contract out, based on the cost of performance. Although the initial decision to contract out was appealed, the appeal was denied, and the contract was awarded on July 12, 1996. The contractor started work on October 1, 1996. The contract was awarded to East, Inc., a Maryland firm.

## Costs and Savings

The original total contract period, including option periods, began in October 1996 and is expected to cover 60 months. For this analysis, we have analyzed the costs through the end of FY 1999, the first 36 months of the contract. The adjusted baseline cost for this period is estimated at \$30.8 million, the adjusted in-house bid was \$20.7 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$17.5 million. The expected savings for the first 36 months of the contract are \$13.3 million or 43 percent.

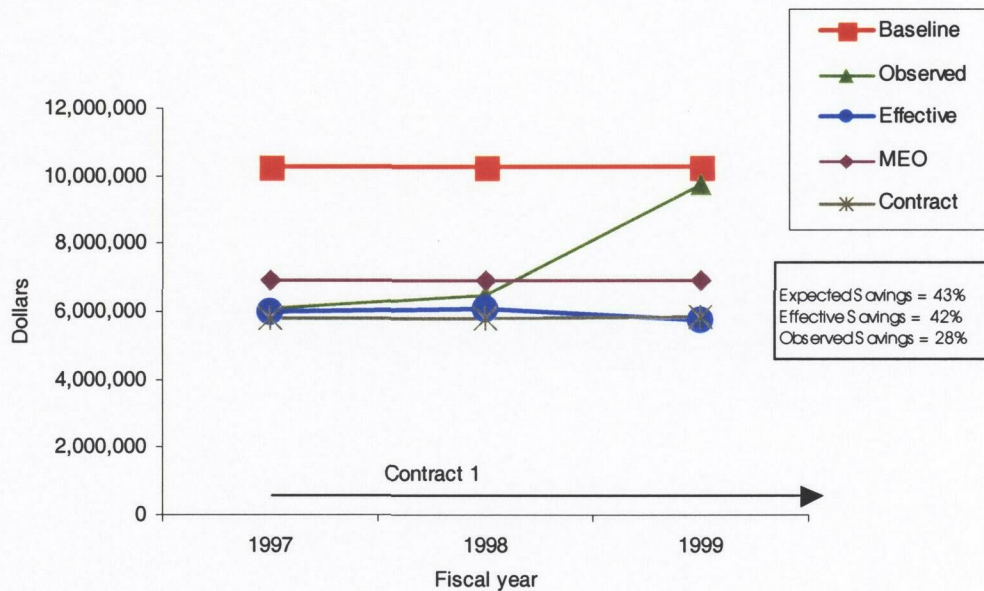
We examined the files to determine the observed cost of contract performance. We found that there had been modification to the contract scope, workload changes, and changes as a result of wage determinations. There were also cost increases to exercise renewal options and to make funds for the renewal periods. These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contract's scope are summarized below. Figure 4 plots the costs for the first solicitation period. They include original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO). The Laughlin BOS contract is now in its first solicitation period.

Figure 4 indicates that effective savings were slightly less than the expected savings of about 43 percent. However, observed savings were only 28 percent and were beginning to approach the baseline costs by the end of 1999. The increase in observed costs was due to significant workload changes starting in 1998. The most significant of these changes are described below:

- Shortly after letting the initial contract, engine maintenance was regionalized at Laughlin. As a result, the number of engines serviced increased from between 100 and 200 to 1,200 per month. This significantly increased the supply workload.
- Fuels and vehicle operations and maintenance were added to the contract scope for about \$2.4 million per year.



Figure 4. Costs: Laughlin AFB, BOS competition, first solicitation period<sup>a,b</sup>



a. Only one solicitation period to date.

b. The annual contract value for the endpoints were estimated based on partial year contract costs.

- In 1998, janitorial and housekeeping supplies were eliminated from the supply inventory. This decreased workload by about one work-year.
- In September 1999, the contractor assumed the responsibility of tracking retention items with minimal workload change.

## Performance

As we see in figure 5, interviews with the contracting personnel, functional personnel, and customers indicate that the contractor's performance was rocky at the beginning, but has improved markedly in the last year.<sup>1</sup> In particular, customers complained about the quality and timeliness of supplies provided to support aircraft maintenance and poor workmanship in repairing and maintaining facilities. However, the improvements have been the greatest in the supply and

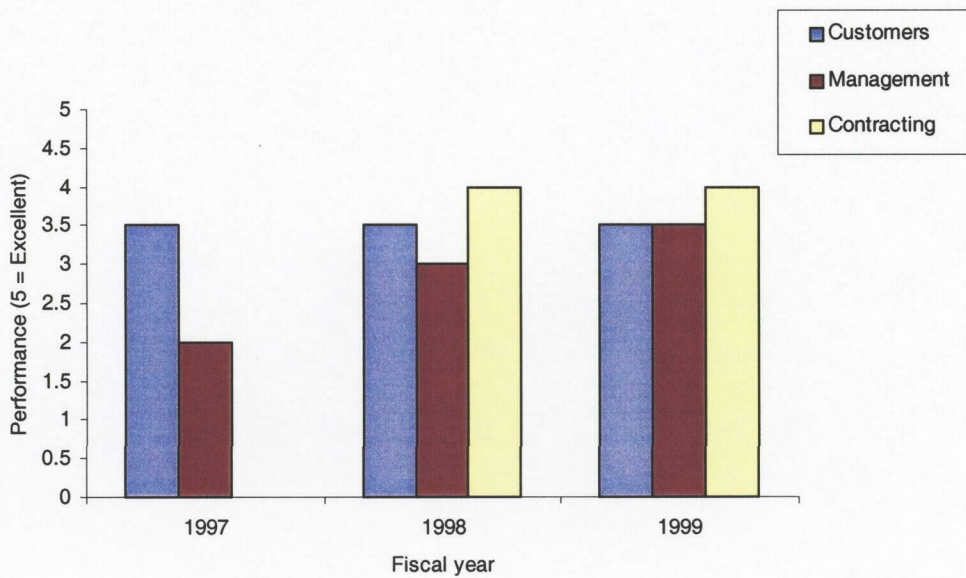
1. Only contracting personnel currently assigned to the contract were available for interviews.

transportation areas. From the interviews, it appears that there were several reasons for the contractor's early performance problems:

- *Size and scope.* East Inc. was the winning contractor. Its prior experience has been with vehicle operations and maintenance, and the Laughlin BOS contract is the largest contract, and the first multi-function contract, that East has had. This is also the first time that East has had a contract for supply and facilities maintenance. This increase in size and scope has caused East some transition and implementation problems during the first year of the contract. There were particular problems with the facilities maintenance portion of the contract. The principal problem is that the contractor is not updating job orders in facilities maintenance as quickly as the contract requires.
- *Tension between contractor and government.* Tensions often run high when an activity is first contracted out and government employees are adversely affected by the decision. Such was the case when the BOS functions at Laughlin AFB were contracted out. East's first project manager had difficulty establishing a positive relationship with the government representatives on the contract. The contracting officer and the East representatives believe that the tensions in this relationship were exacerbated by government quality assurance evaluators (QAEs) who, in the view of the contractor and the contracting officer, were "overzealous" in monitoring contract compliance.
- *High turnover in personnel.* Both the contractor and the government have had a lot of personnel changes since the contract was awarded. The contractor's original project manager was replaced about a year ago as were the contractor's representatives for supply and facilities maintenance. On the government's side, there have been multiple changes in the contracting officer, contract administrators, administrative assistants, and QAEs. There has also been a shift in organizational responsibility for the contract in the last year. The contracting officer now believes that the government is monitoring the contract more thoroughly.

- *Budget cuts.* Although budget cuts to the installation have not affected the contract itself, the funds budgeted for the supplies provided by the Air Force to the contractor have been cut. For example, the funds available to purchase supplies for facilities maintenance were cut last year from \$900,000 to \$750,000. This caused a problem when several expensive pieces of equipment failed and had to be replaced. A budget supplemental had to be approved to take care of the shortfall caused by the equipment failures.

Figure 5. Performance: Laughlin BOS contract



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# **Base Operations Support: Goodfellow AFB (F0JCGU83)**

## **Background**

The Air Force announced the competition of BOS at Goodfellow AFB on January 19, 1991. The competition was to cover facility maintenance and repair, motor vehicle operations and maintenance, supply operations, and the base telephone switchboard. The scope included grounds maintenance only for the facilities of the four activities included in the performance work statement. It was a labor-only solicitation. Many of the facilities maintenance functions, such as custodial services, refuse collection, and housing maintenance, had already been contracted and were therefore excluded from the scope of the competition. Architect/engineering services were excluded because the base felt that the Brooks Act prescribing the procurement of such services conflicted with A-76. Munitions were not part of the original competition but were added two years later. Because Goodfellow does not have aircraft, the supply function did not cover any aircraft parts.

The original in-house organization expended a total of 311 work-years to perform these functions—222 military work-years and 89 civilian work-years. The MEO included 176 civilian work-years plus roughly 79 non-appropriated funds (NAF) work-years—the number of billets authorized in the unit manning document (UMD). The competition was restricted to small disadvantaged businesses and received five private-sector competitor bids.

The preliminary decision was to retain the activity in-house based on the cost of performance. The contractor appealed the decision, but the appeal was rejected. The solicitation was cancelled on June 24, 1994. Work under the MEO began in October, 1994.

To date, no additional cost comparisons have been performed. According to the base manpower officer, a 1999 review of the in-house costs indicated that they were still less expensive than contract alternatives, and in-house performance was continued. The Air Force Education and Training Command (AETC) is systematically competing the BOS functions at all of its bases as part of its Pick-a-Base program. Goodfellow AFB was not one of the initial bases that AETC has chosen for its first round of new BOS competitions. A recompetition of the base's BOS functions will occur in one of the subsequent rounds of competition.

## Costs and Savings

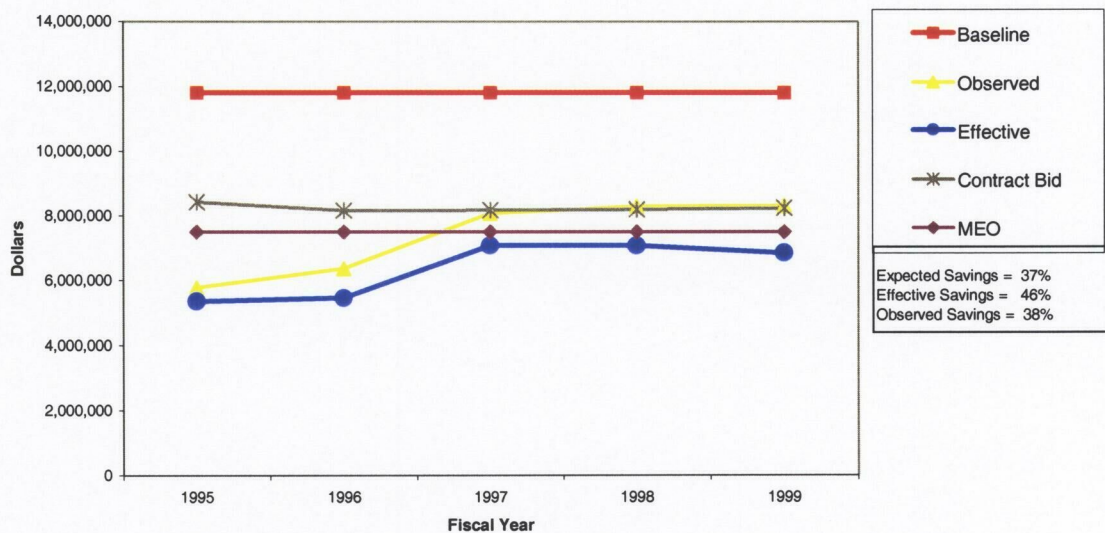
The first solicitation period, including option periods, covered 48 months with an initial start date of October 1, 1994. In-house performance has been extended beyond the first solicitation period and is included in figure 6 below since no subsequent competition has been held. The baseline cost for this full period is estimated at \$59 million, the adjusted in-house bid was \$41 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$37.5 million. The expected savings for the first solicitation period (including extensions) were about \$22 million or 37 percent.

We examined the files to determine the observed cost of in-house performance and found that there are several modifications to the MEO for changes in the base's mission. These adjustments affect the cumulative cost of the in-house performance and increase the base cost for subsequent years. These adjustments to the MEO's scope are summarized below. (We show actual in-house costs only for those periods where permanent increases in the base cost occurred.) Figure 6 plots the original baseline cost, the contract bid, the observed in-house cost, the original in-house bid, and the effective cost of in-house performance over time.

Figure 6 shows that the expected costs were 37 percent less than the pre-competition baseline cost. Even with the changes in scope, workload, and wage rates, the observed costs were actually less than the expected costs. As a result, observed savings were 38 percent. Once the adjustments to the observed costs were made to ensure an

apples-to-apples comparison, the effective savings for the MEO were 46 percent. Again, this bettered the expected savings by 9 percentage points. One reason for this better-than-expected savings profile is that the base has a 5-to 8-percent vacancy rate and can never hire quickly enough to staff up to the number of positions authorized by the MEO. Therefore, the existing personnel must be more productive in order to meet the performance requirements. Another reason may be that the decrease in supply operations workload has not been compensated by a corresponding increase in workload elsewhere in the functions covered by the MEO. So far, the MEO has been protected against arbitrary budget cuts, and reductions to it have been achieved without reductions-in-force.

Figure 6. Costs: Goodfellow AFB, BOS contract, first solicitation period<sup>a</sup>



a. In-house win: Costs presented cover competition to current competition: Goodfellow - Base Operations Support #F0JJCGU83.

The most significant changes to scope and workload have been:

- In January 1995, the Fire School was added to the base's mission, and the Marines began to send students to Goodfellow AFB. The Marines brought their own trucks, but they did not bring people to take care of them. This additional mission added of ten FTE—two for vehicle maintenance and operations function; six for facilities maintenance; and two for the switchboard.
- In March 1996, the fence around the intelligence buildings was replaced by an electronic management control system. This change in scope added six FTE to the facilities maintenance function. Two additional FTE were also added to the supply function because of the introduction of the IMPAC card. The closure of Reese AFB added one additional FTE in supply for warehousing, shipping, and inspection, and two FTE in facilities maintenance to handle the increased purchasing. The total increase was 11 FTE.
- In 1997, the supply workload dropped because of the introduction of the IMPAC card, and the staffing was reduced from 50 FTE to 32 FTE, or a total of 18 FTE in the supply function. Supply stopped supplying individual equipment such as firetraining clothing and equipment. This eliminated one FTE.
- In 1998, the base service store was transferred to a workshop for the blind, and the MEO was reduced by three FTE. The motor vehicle operations and maintenance function was also reduced by two FTE because of decreased workload.

## Performance

Interviews with customers indicate that the in-house performance has been excellent throughout the performance period. There was a slight dip in responsiveness during the transition period, but this was rapidly overcome. In the customer's view, the transition to the MEO was a relatively smooth one, even though the base had difficulty hiring the needed number of civilian employees to replace the military who had performed the function prior to competition. In the view of several customers, the removal of the military personnel has improved performance because there are no delays associated with the military's involvement in an

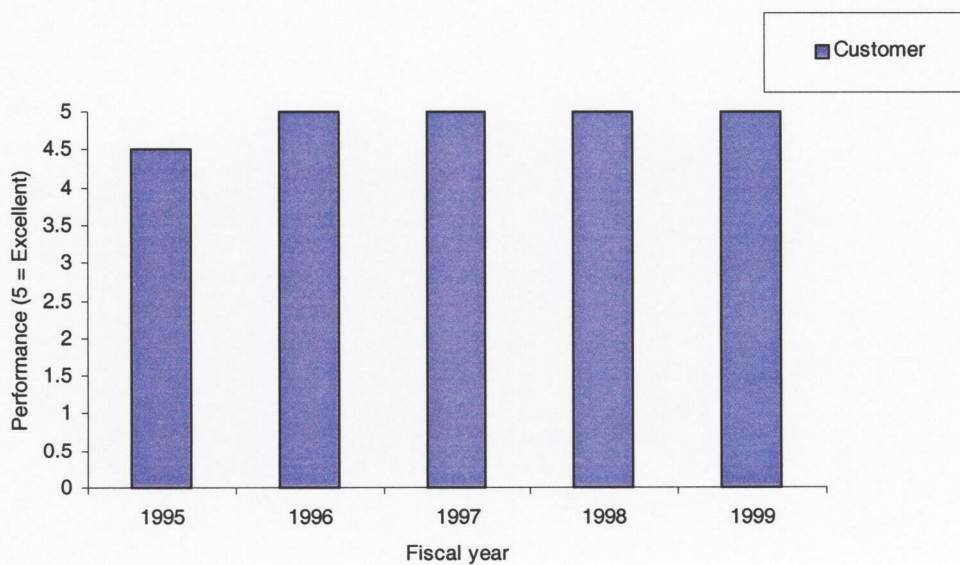


exercise. Many believed that the work was performed faster because there is increased multi-tasking and improved scheduling. The consensus was that in all functions covered by the MEO, the service was prompt, the quality of work was good, and the people were professional. Most felt that the workforce went out of its way to serve its customers.

Customers of facilities maintenance services said that they have felt the effects of budget cuts, particularly because of the changes needed to upgrade buildings for new technology, especially in the classrooms, and because the facilities were aging and the need for repairs was more frequent. Even with these concerns, all the customers that we interviewed felt that the quality of service was better than it was 5 years ago.

Figure 7 graphs the customers' assessment of performance. We did not interview any contracting personnel because the function was retained in-house. We did interview management personnel, but we cannot include their assessment because they were, in essence, evaluating their own performance.

Figure 7. Performance: Goodfellow AFB, BOS contract



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# **Family Housing Maintenance: Davis-Monthan AFB (F1CFBNV39)**

## **Background**

The Air Force announced the competition of housing maintenance at Davis-Monthan AFB on September 10, 1993. The competition began in January, 1994, and was completed in December 1995. The function included change-of-occupancy maintenance, interior painting up to 100 square feet, exterior touch-up painting, maintenance of utility lines up to 5 feet from the housing unit, repair of plumbing and heating and air conditioning, exterior inspections, and minor repair of roofs. Pest control and replacement of appliances were later added to the scope. Eighty percent of the work is generated by changes in occupancy. The scope covered the 1,240 family housing units on base. Most of the housing was built or renovated between 1972 and 1975, although 163 units were built in the last 3 years.

The original in-house organization expended a total of 31 work-years to perform these functions—14 military work-years and 17 civilian work-years. The MEO included 28 civilian work-years. The competition was restricted to small businesses, and four private sector firms submitted bids.

The decision was to convert the function to contract, based on the cost of performance. The contract was awarded in December 1995, and work began January 7, 1996. There were no administrative appeals or protests of the decision.

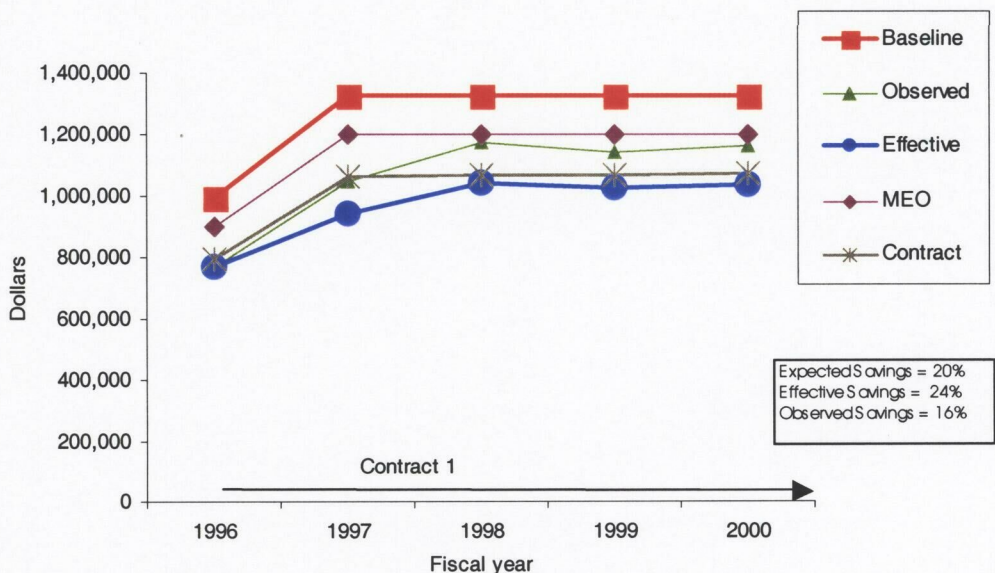
## **Costs and Savings**

The first solicitation period, including option periods, covered 57 months with an initial start date of January 7, 1996. The baseline cost for this period is estimated at \$6.3 million over the performance

period, the adjusted in-house bid was \$5.7 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$5.1 million. The expected savings for the first solicitation period (including any extensions) were about \$1.2 million or 20 percent.

There has been only one solicitation period to date. We examined the files to determine the observed cost of contract performance. We found that there had been workload changes, changes in contract scope, and changes as a result of wage determination. There were also cost increases to exercise renewal options, and to make funds for the renewal periods. These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contract's scope are summarized below. Figure 8 plots the costs for the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO)

Figure 8. Costs: Davis Monthan, Family Housing Maintenance contract, first solicitation period<sup>a</sup>



a. Only one solicitation period to date.

The contract was expected to save 20 percent of the cost prior to competition. The average effective cost of the contract to date is 24 percent below the baseline. During the first year of the contract, the effective costs were 23 percent below the baseline. This represents a 16-percent decrease in the contractor's original bid for the first year because the historical workload contained in the solicitation was higher than the actual work performed by the contractor. Even the observed costs, with all the scope and workload changes, is 16 percent below that of the MEO and the baseline.

Over the course of the contract, there have been changes in scope and workload, especially in the first several years. These changes, which have had a significant impact on the observed costs of the contract, include the following:

- Initially, pest control was provided only during change of occupancy. In 1997, the scope of the contract was revised so that pest control was also provided to tenants on a limited basis for termites and roach control.
- There was a one-time increase to remove and test a sample of floor tiles for asbestos in 1997.
- In 1998, gas furnaces were tested for potential cracks in the heating block.
- In 1998, roughly 200 dishwashers and stoves were replaced.
- In 1998, screen doors were replaced with storm doors.

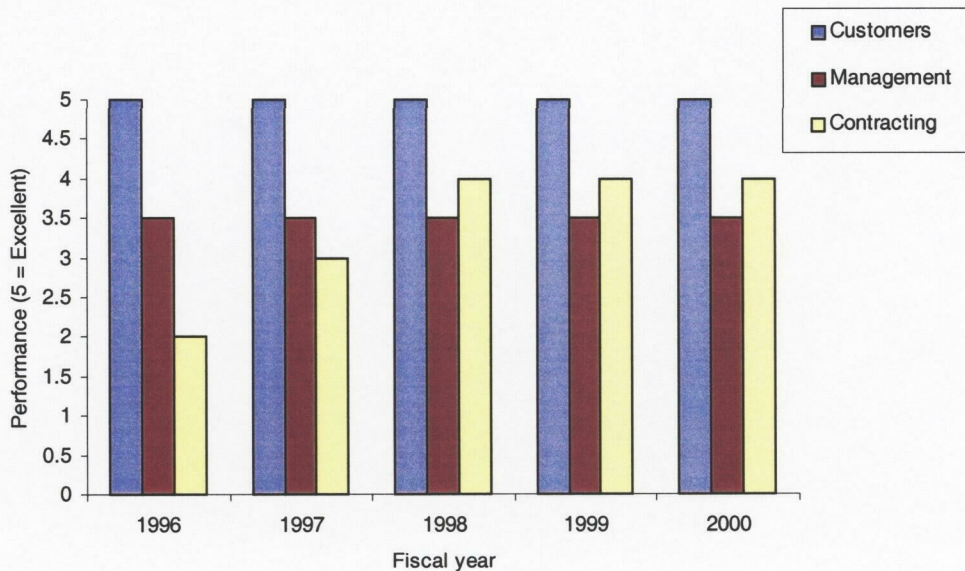
## Performance

Figure 9 shows that the base personnel we interviewed were satisfied or very satisfied with the contractor's performance. The customers felt that the contractor responded quickly to their needs and worked with them to schedule repairs at mutually convenient times. They felt that little or no rework was necessary. The customers also liked the self-help center that the contractor ran, and found the personnel there to be friendly and helpful. The self-help center provides tenants with handtools, grass seed, and the like, so that they can perform minor maintenance themselves.

Initially, the management representatives were unhappy with the contractor's performance, mainly because they felt that the contractor lacked a good quality assurance plan. As a consequence, they felt that the government had to perform the needed quality control checks as well as quality assurance. They also felt that, initially, the contractor was late in turning over buildings after he had performed change-of-occupancy maintenance and repair. However, the contractor's performance has improved to the point that now the contractor routinely turns a building over in 4 days in comparison with the 5 to 8 days it took when the work was performed in-house.

The contracting representative was also satisfied with the contractor's performance, especially after the first year. During the first year, he felt that the contractor was often late in turning over buildings and that the QAEs might have been over-energetic in interpreting the provisions of the contract and in writing deficiency reports. However, in the last several years he felt that both of these situations had improved greatly.

Figure 9. Performance: Davis Monthan, Family Housing Maintenance contract



# **Family Housing Maintenance: Randolph AFB (FOJTYMX39B)**

## **Background**

The Air Force announced the competition of its family housing maintenance services at Randolph AFB in March 1992. The competition began in May 1992 and was completed on April 5, 1994. The function initially included 1,019 housing units which included both Wherry and Capehart housing. The housing was at least 40 years old. The contract covered plumbing, roofing, heating and air conditioning maintenance and repair, repair of termite damage, maintenance of appliances, and painting of areas 200 square feet or less.

The original in-house organization expended a total of 45 work-years to perform the function. Thirty-six work-years were announced. The MEO was 36 civilian work-years. The competition was a negotiated procurement restricted to small and disadvantaged businesses. The procurement, was on a firm fixed-price basis, and ten private-sector firms submitted bids.

The preliminary decision was to convert the function to contract, based on the cost of performance. The contract was awarded in August 1994, and work began in January 1995. Originally, the contract was scheduled to start in July 1994; however, the start day was delayed due to appeals.

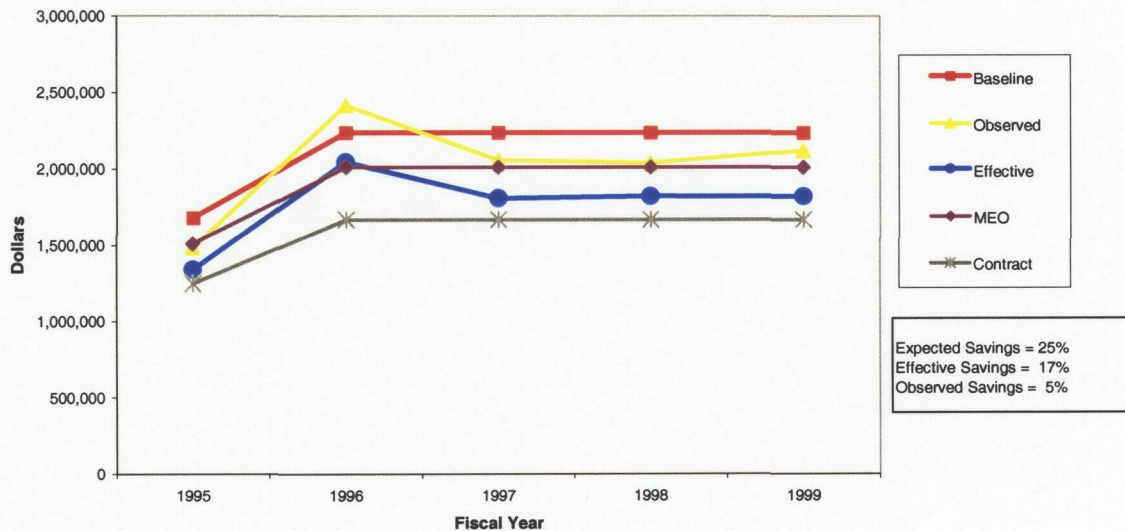
## **Costs and Savings**

The first solicitation period, including option periods and extensions, will cover 60 months with an initial start date of January 1, 1995. For this analysis, we have covered the period January 1, 1995 through September 30, 1999. The baseline cost for this period is estimated at \$10.6 million, the adjusted in-house bid was \$9.5 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$7.9 million. The expected savings for the period of analysis is about \$2.7 million or 25 percent.

We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract workload, both on a one-time and a recurring basis, as well as changes in wage determinations. Most of the adjustments were for workload changes such as one-time replacement of flooring, dishwashers, and refrigerators. There was also a change of scope when the contractor adopted a crew chief concept that included a supervisor for each housing area.

These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contract's scope are summarized below. Figure 10 plots the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

Figure 10. Costs: Randolph AFB, Family Housing Maintenance contract, first solicitation period<sup>a</sup>



a. Only one solicitation period to date.

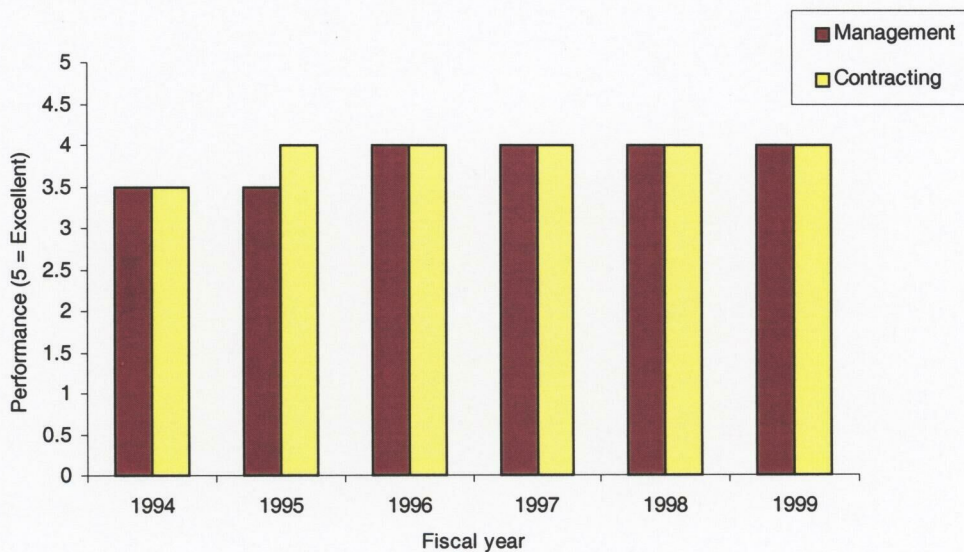


The contract was expected to save 25 percent of the cost prior to competition. Once the adjustments to account for one-time costs such as workload changes had been made, the effective costs were 17 percent below the baseline cost prior to competition. Even with all the changes for scope, workload, wage determinations, and one-time costs, observed costs for the first contract were, on average, 5 percent less than the pre-competition baseline.

## Performance

Overall, the managers and contracting representatives that we interviewed were satisfied with the contractor's performance. In their view, his performance has been at or above the in-house level prior to competition. This high level of performance has continued throughout the solicitation period. There were only minor problems during the transition period, but the people we spoke with said that the contractor rapidly overcame them. Figure 11 shows their rankings. We were unable to interview any customers.

Figure 11. Performance: Randolph AFB, Family Housing Maintenance contract



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# **Family Housing Maintenance: Langley (F1CMUHJ39)**

## **Background**

The Air Force announced the competition of its family housing maintenance services at Langley AFB in January 1992. The competition began in March 1992 and was completed in April 1994. The function initially included housing at Bethal Manor, which has units of both Wherry and Capehart housing, all at least 40 years old. The solicitation covered plumbing, roofing, and heating and air conditioning maintenance and repair. The 18 sets of quarters on the main base were not included in the scope of this competition.

The original in-house organization expended a total of 27 work-years to perform the function. The MEO was 22 civilian work-years. The competition was a negotiated procurement restricted to small and disadvantaged businesses. The procurement was on a firm fixed-price basis, and nine private sector companies submitted bids.

The preliminary decision was to convert the function to contract, based on the cost of performance. The contract was awarded in April 1994, and work began June 1, 1994.

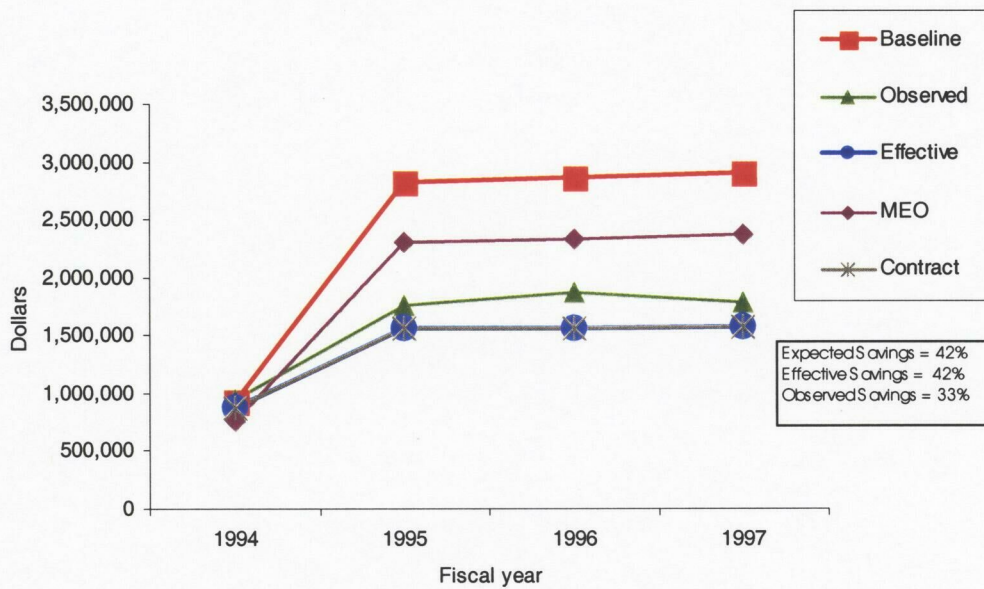
## **Costs and Savings**

The first solicitation period, including option periods, covered 40 months with an initial start date of June 1, 1994. The baseline cost for this period was estimated at \$9.5 million, the adjusted in-house bid was \$7.8 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$5.6 million. The expected savings for the first solicitation period (including extensions) were over \$3.9 million or 42 percent.

The contract was resolicited in 1998. We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract workload, on both a one-time and recurring basis, as well as changes in wage determinations.

These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contract's scope are summarized below. Figure 12 plots the costs for the first solicitation period. They include the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

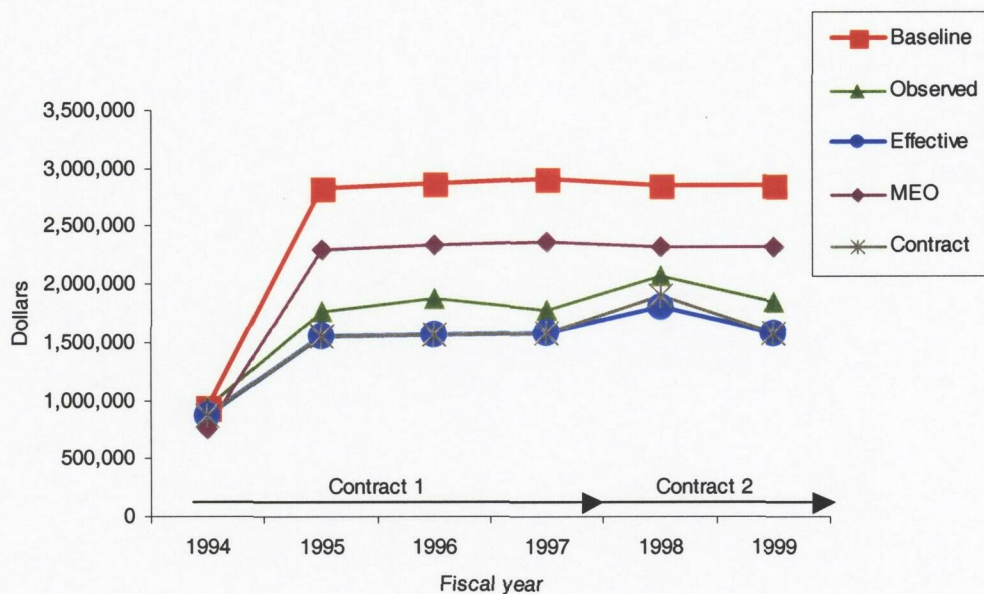
Figure 12. Costs: Langley AFB, Family Housing Maintenance contract, first solicitation period



The contract was expected to save 42 percent of the cost prior to competition. Once the adjustments to account for one-time costs such as workload changes had been made, the effective costs equaled the

expected costs, and thus the effective savings were 42 percent below the baseline cost prior to competition. Even with all the changes for scope, workload, wage determinations, and one-time costs, observed costs for the first contract were 33 percent less than the precompetition baseline. As we see in figure 13, effective costs during the second contract period were 5 percent less than the contract bid costs.

Figure 13. Costs: Langley AFB, Family Housing Maintenance contract, all contract periods



During both contract periods, there were changes in workload and wage determinations, as well as one-time changes. These were the most significant of those changes:

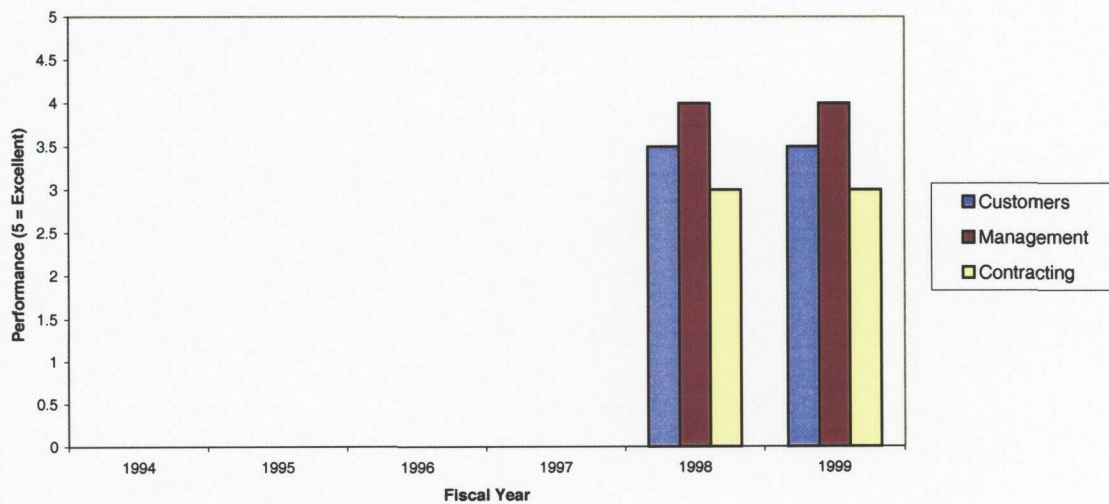
- In January 1996, the estimated workload was increased because the contractor was making more service calls than had been estimated in the solicitation.
- In September 1996, there was a “reimbursable materials adjustment” of \$1.8 million in FY 1996 and \$1.7 million for FY 1997.
- In FY 1998, there was an increase for major roof repairs.

- In FY 1999, there was a one time increase in workload due to damage caused by Hurricane Floyd. However, the contractor did not increase the size of his workforce to repair the hurricane damage, but elected instead to use his existing workforce. This decision created a backlog in the contractor's regular workload.

## Performance

As we see in figure 14, we were able to interview customers, management, and contracting officers for only the second contract (FY 1998 and FY 1999). The customers that we interviewed were satisfied with contractor performances, although there was some dissatisfaction with the length of time it was taking for routine repairs because of the backlog created by the clean-up after Hurricane Floyd. Also, some general misunderstandings between the customers and the contractor had created difficulty for the QAE. For example, one customer complained that the contractor had not removed some tree branches that were blocking her doorway. A further discussion with the government's QAE revealed that the customer was in fact responsible for removing the branches. The QAE is now conducting a series of town meetings for the purpose of educating customers about their responsibilities and those of the contractor.

Figure 14. Performance: Langley AFB, Family Housing Maintenance contract



# **Facilities Maintenance: Fort Leonard Wood (A6463)**

## **Background**

The Army announced the competition of its logistics services at Fort Leonard Wood in August 1983. The competition began in November 1987 and was completed in March 1988. The function included the base's facilities operations and maintenance functions. Specifically, it included building and some housing maintenance, high voltage electrical distribution and repair, entomology, plumbing, heating and air conditioning, utilities, and road maintenance. Grounds maintenance, including grass cutting and landscaping, was originally included, but was later removed from the scope. The scope covered the base as well as the Lake of the Ozarks recreation area. The scope excluded external and internal painting because it was already contracted out. It also excluded the architect/engineering activity. The performance work statement (PWS) was divided into two components—a firm fixed-price component and a job order component. We did not include the job order component in our cost analysis because it was not costed as part of the scope of the original competition.

The original in-house organization expended a total of 251 work-years—248 civilian and 3 military—to perform the function. The MEO was 238 civilian work-years. The competition was unrestricted, negotiated procurement. The initial procurement was on a firm fixed-price basis but was later changed to a cost-plus award fee basis for the second and third contracts.

The decision was to convert the function to contract, based on the cost of performance. The contract was awarded in March 1988 and work began June 1, 1988. Since the initial A-76 cost completion, there

have been two subsequent resolicitations—the first completed in 1993 and the second completed in 1998.

## Costs and Savings

The first solicitation period, including option periods and extensions, covered 58 months. The baseline cost for this period is estimated at \$55 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$43.5 million. The expected savings for the first solicitation period (including extensions) were about \$11.5 million or 21 percent. As the validity of the original cost comparison was in question at the time of award, and subsequent documentation was unavailable, we were unable to confidently identify the in-house bid for this competition.

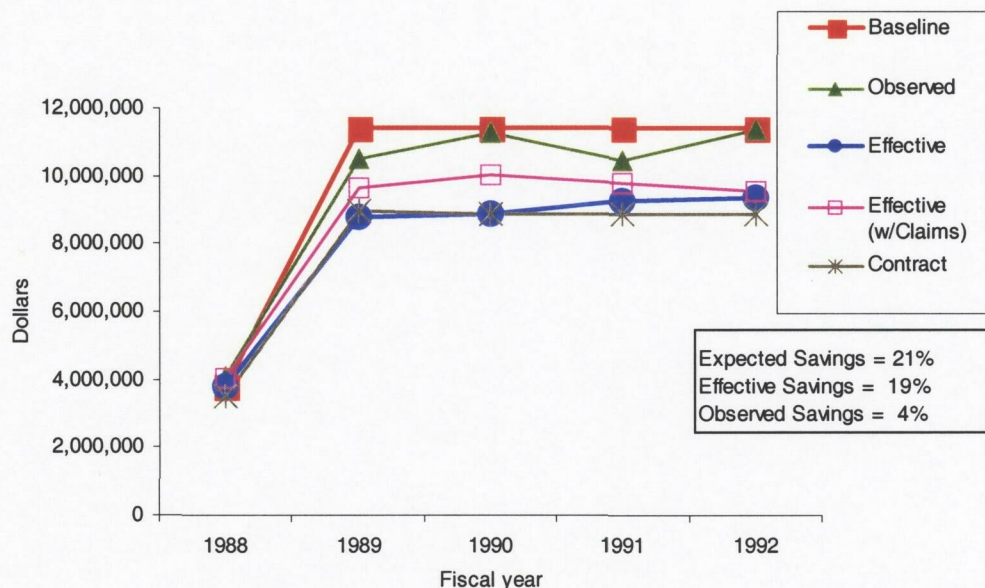
We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract scope and workload, as well as changes in wage determinations. For the most part, the changes in the first contract were for workload changes and one-time projects, and resolution of claims due to inaccurate and outdated workload estimates in the original competition. Reimbursement for claims amounted to \$2.7 million in the first contract. The changes to the second contract were primarily for changes in scope. As of the end of 1999, there had been no increases to the third contract.

The adjustments for scope, workload, and wage changes affect the cumulative cost of contract performance and increase the base cost for subsequent years. Figure 15 plots the costs for the first solicitation period. They include original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an “apples-to-apples” comparison with the baseline; and the cost of the in-house bid (MEO).

The first contract was expected to save 21 percent of the cost prior to competition. Once the adjustments to account for one-time costs and scope changes that would have occurred even if the function remained in-house, the effective costs were 16 percent below the baseline cost prior to competition. On average, observed costs were 4 percent lower than



Figure 15. Costs: Fort Leonard Wood, Facilities Maintenance contract, first solicitation period

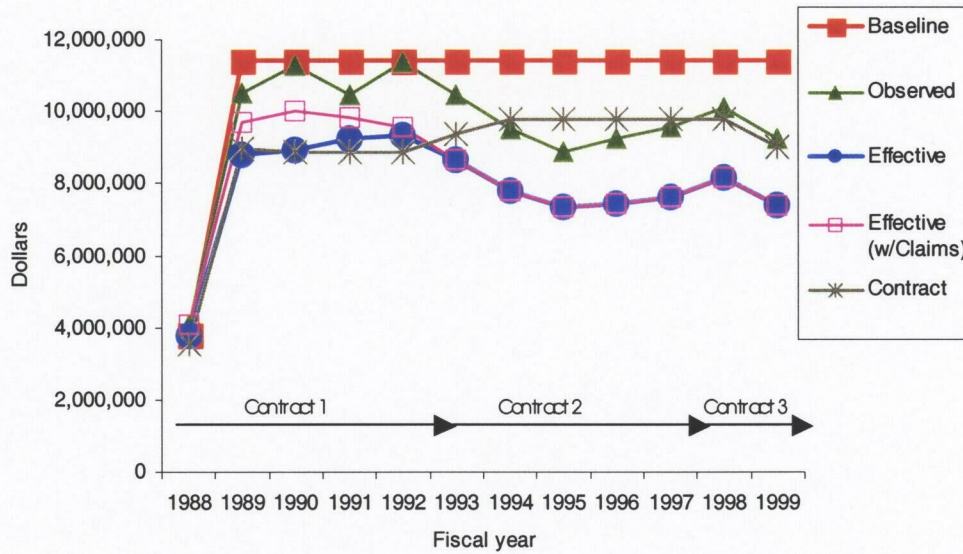


the pre-competition baseline. As figure 16 illustrates, effective costs were 1 percent lower than the contract bids for the second and third contracts.

## Performance

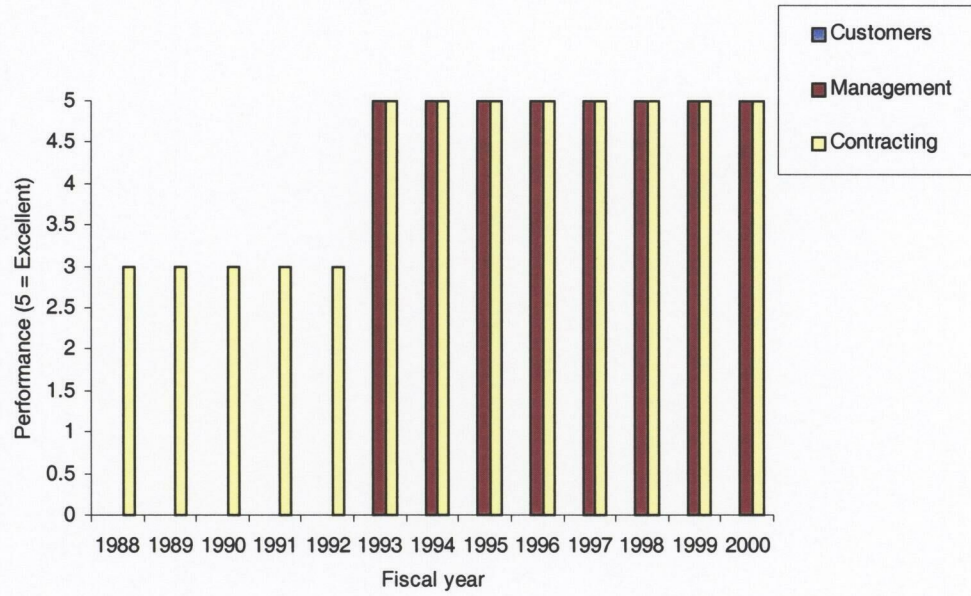
Although contract and management personnel were dissatisfied with the first contractor's performance, they rated the second and third contractors' performance as excellent. (See figure 17.) During the first contract, representatives were concerned that the contract was costing more than it should and that the contractor was always looking for opportunities to increase the contract scope and costs. They also felt that work often was not properly performed the first time and had to be repeated. Part of the explanation for this significant change in view between the first and second contractor's performance, may be that the first contract was a firm fixed-price type of contract and the workload estimates at the time of the competition were outdated. As a result, the contractor was regularly seeking workload adjustments and filing claims.

Figure 16. Costs: Fort Leonard Wood, Facilities Maintenance contracts, all contract periods



The contract type was changed to cost-plus for the second and third contractors, which eliminated the earlier problems in estimating workloads. We were unable to interview any customers or any of the management personnel who monitored the first contractor's performance.

Figure 17. Performance: Fort Leonard Wood, Facilities Maintenance contracts



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# Supply Operations: Oceana NAS (N830062)

## Background

The Navy announced the competition of its supply function at NAS Oceana in May 1983. However, the solicitation was not issued until October 1990, and was completed in January 1991. The initial scope of the supply function that was competed included receiving; packing; shipping; and the SERVMART, a self-service supply store for base customers. It excluded the storage and distribution of supplies.

The original in-house organization expended a total of 33 work-years to perform the function. The MEO was also 33 work-years. The competition was for sealed bids and was restricted to small businesses. The procurement was for a firm fixed price.

The preliminary decision was to convert the function to contract, based on the cost of performance. The contract started on January 1, 1991.

## Costs and Savings

The initial total contract period, including option periods and extensions, covered 45 months with an initial start date of January 1, 1991. The baseline cost for this period is estimated at \$3.8 million, the adjusted in-house bid was \$3.5 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$3.0 million. The expected savings for the first solicitation period (including extensions) were about \$0.3 million or 20 percent.

We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract scope and workload, as well as changes in wage determinations. The most significant change during the first contract was the unionization of the contract workforce. This occurred shortly after the decision to contract out was made. This change eliminated most of the anticipated savings from the competition. For example, the wage

increases as a result of the collective bargaining agreement were valued at \$124 thousand for the first full year of the contract. The contract was resolicited in 1994 and again in 1999. A different contractor won the contract in 1999. The contract workforce remained unionized through the second contract, but the union contract expired just before the third contract was awarded. The third contractor bid a non-union workforce, but at the time of our interviews, base management indicated that the workforce had once again voted to join a union.

Since the function was contracted, there has been an increase in workload because of two Base Realignment and Closure (BRAC) actions: the single siting of the F-14 and the transfer of F-18s from NAS Cecil Field. These actions occurred in 1993-1994. However, by the end of the first contract, SERVMART and the hazardous material warehouse were eliminated from the scope of work. In addition, there has been a general decline in demand because of the increased use of the IMPAC card. The adjustments for scope, workload, and wage changes affect the cumulative cost of contract performance as well as increase the base cost for subsequent years.

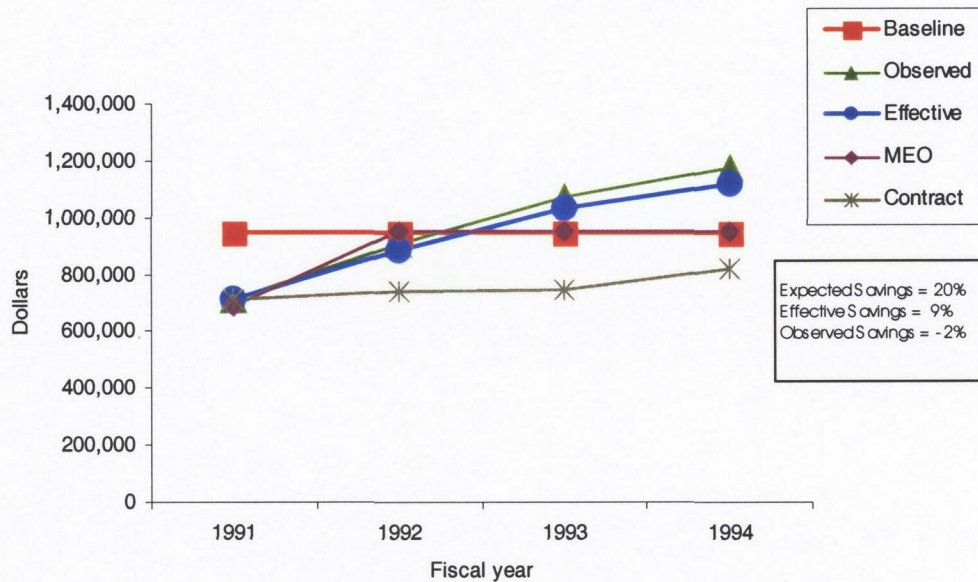
Figure 18 plots the costs for the first solicitation period. The cost lines include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

The first contract was expected to save 20 percent of the cost prior to competition. Once adjustments had been made to account for one-time costs and scope changes that would have occurred even if the function remained in-house, the effective costs were 9 percent below the baseline cost prior to competition. With all the changes for scope, workload, wage determinations, and one-time costs, observed costs for the first contract were 2 percent more than the precompetition baseline.

Figure 19 graphs these costs for the first and second solicitation periods. The third solicitation period is not shown because it had just begun when we did our analysis and little data were available. As we see in the chart, the effective costs and observed costs that had risen

above the baseline and MEO at the end of the first solicitation period, fell below the baseline during the second contract. It is unclear from the documentation whether the decrease in effective and observed costs resulted from the decrease in contract scope or a decrease in contract price because of competition during the resolicitation, or some combination of both. On average, there has been a 12-percent annual increase in effective costs above the contract bid during both solicitation periods.

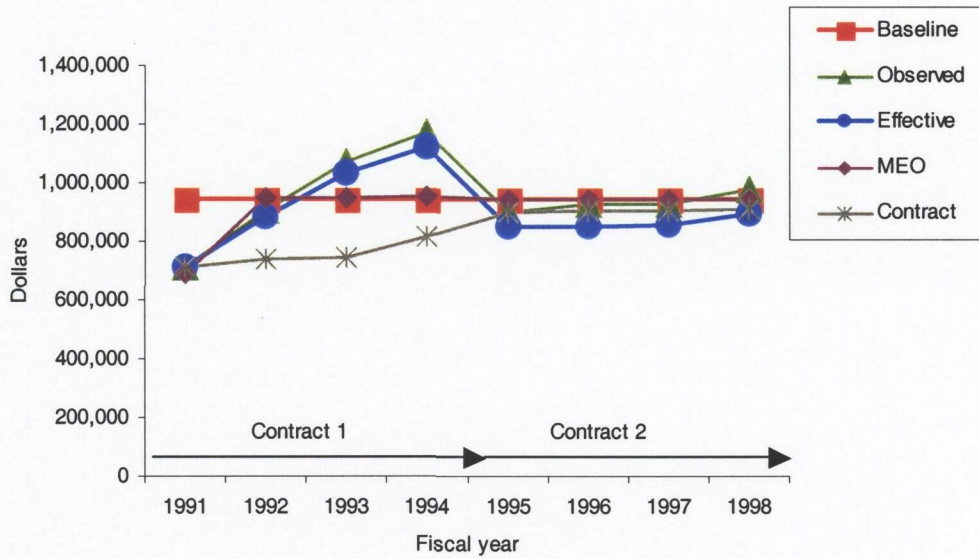
Figure 18. Costs: Oceana NAS, Supply Operations contract, first solicitation period



## Performance

As we see in figure 20, management has been pleased with the contractors' performance. Managers believe that contractor performance is better than the precompetition in-house performance. In their view, the contractors have increased inventory accuracy and decreased employee absenteeism. The contractor has also helped solve operational problems such as the elimination of duplicate documents. The warehouse manager, in particular, stated that the performance has been excellent. Since the initial competition, the performance standards have been tightened significantly. Initially,

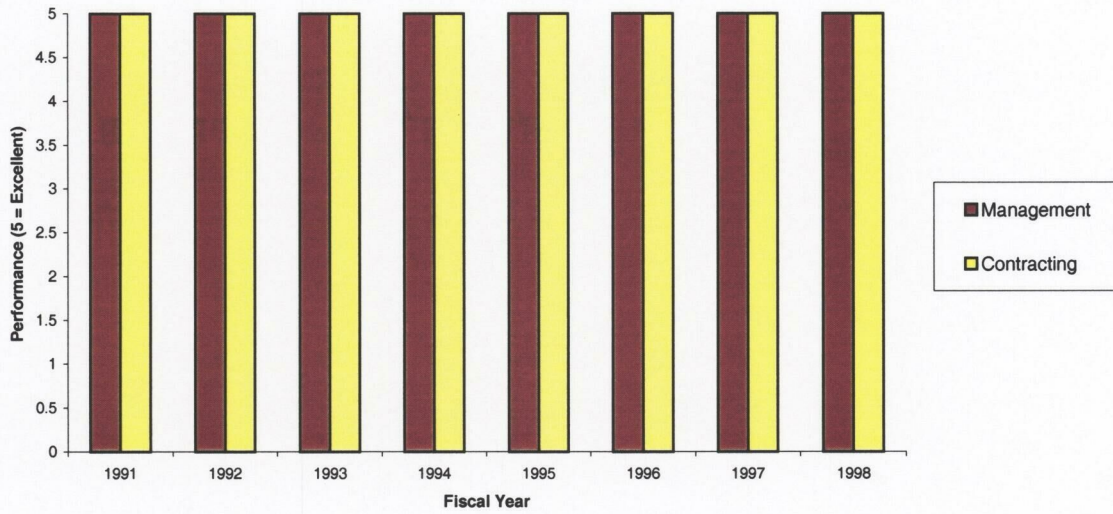
Figure 19. Oceana NAS, Supply Operations contract, 1st and 2nd solicitation periods



the contractor was held to the NAVSUP system’s standards (UMIPs); however, because the supply operation’s main mission is to support the flightline, the performance standards have been gradually tightened so that they meet those set by the NAVAIR system (NAMPs). For example, priority 1 delivery time was 3 days under the supply system, and is one hour under the NAVAIR system. The contractor now routinely meets the new standards. These representatives also indicated that the transition between in-house and contractor operation and between contractors has been very smooth. Only 15 days were allowed for the transition between contractors.



Figure 20. Performance: Oceana NAS, Supply Operations contract



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# Supply Operations: Yorktown NWS (N841580)

## Background

The Navy announced the competition of its supply services at Yorktown Naval Weapons Station in April 1982, and the competition was completed in November 1989. The function included the base's supply functions, such as receipt, storage, issue, and delivery/transfer of materials, as well as rewarehousing of materials to other storage locations. It covered ordnance material and petroleum products as well as more commonly used supplies. It also covered the operation of the gas stations and provision of petroleum products.

The original in-house organization expended a total of 23 work-years to perform the function. The MEO was 20 civilian work-years. The competition was unrestricted, negotiated procurement. The procurement was on a firm fixed-cost basis. The decision was to convert the function to contract, based on the cost of performance. The contract began November 11, 1989.

## Costs and Savings

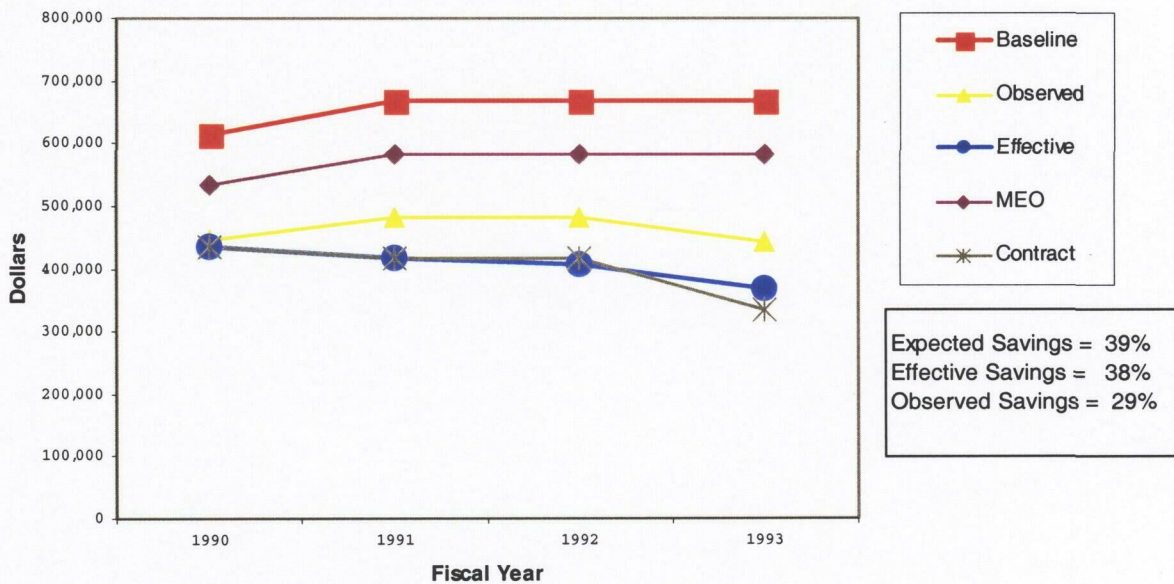
The initial total contract period, including option periods and extensions, covered 48 months with an initial start date of November 11, 1989. The baseline cost for this period is estimated at over \$2.6 million, the adjusted in-house bid was \$2.3 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$1.6 million. The expected savings for the first solicitation period (including extensions) were about \$1 million or 39 percent.

The contract was resolicited in 1992 and was awarded to the same contractor. Work began under the second contract in November 1993. We examined the files to determine the observed cost of contract performance and found that there were no major modifications

to the contract scope and workload and no major changes in wage determinations for the first contract. Between the first and second contracts, changes in workload and scope resulted in a 40-percent drop in observed costs. During the second contract, there were changes both in wage determinations and in scope and workload.

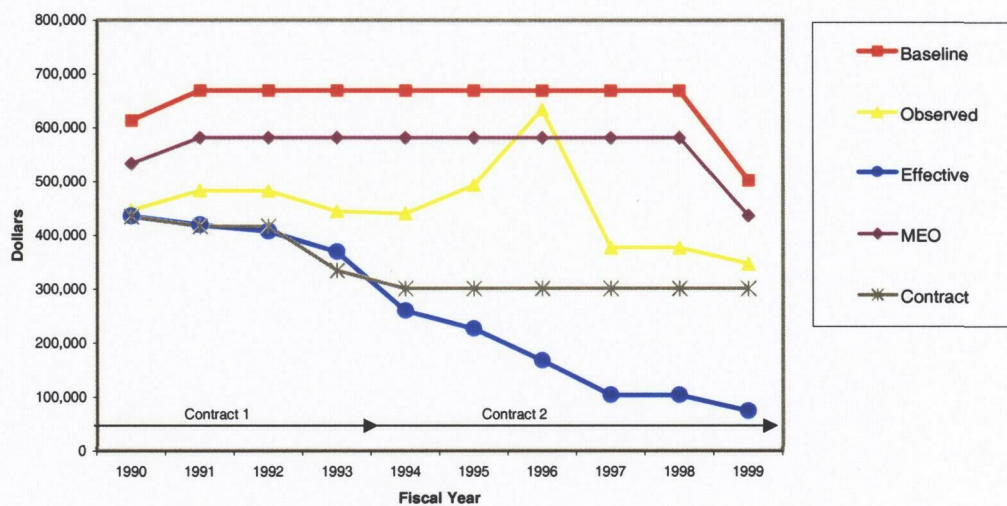
These adjustments affected the cumulative cost of contract performance and increased the base cost for subsequent years. These adjustments to the contracts' scope are summarized below. Figure 21 plots the costs for the first solicitation period. They include original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

Figure 21. Yorktown NWS, Supply Operations contract, first solicitation period



The first solicitation period was estimated to save 36 percent of the cost prior to competition. The effective costs were 38 percent below the baseline cost prior to competition. Even with all of the changes for scope, workload, wage determinations, and one-time costs included, observed costs for the first contract were 29 percent less than the precompetition baseline. Figure 22 illustrates the costs over the first and second contract periods. During the second period, effective costs were 12 percent less than the contract bid.

Figure 22. Costs: Yorktown NWS, Supply Operations contract, all contract periods



Under the second contract, there have been changes in scope, workload, and wage determinations, as well as one-time changes. The most significant of these changes were:

- Between March and May 1994, a warehouse was renovated and a new warehousing scheme adopted that required the contractor to relocate material and dismantle and reassemble bins, racks, and the like. These increases totaled roughly \$105,000.
- In FY 1995, there was a major wage increase totaling \$84,200.
- In FY 1996, the operations at Yorktown were expanded because of a consolidation of slow-moving items at that location. This expansion increased costs by \$94,400.

- Also in FY 1996, the disposal efforts at Cheatham Annex were expanded, adding \$99,200 to the contract. In FY 1998, the projected workload decreased by \$512,240.

## **Performance**

We were unable to interview base personnel for this competition. The review was limited to a review of the contract files.

# Logistics Services: Fort Sill (A1939)

## Background

The Army announced the competition of its logistics services at Fort Sill in December 1980. The competition was completed in March 1988. The function included the base's supply, maintenance, and transportation functions. The maintenance portion included maintenance for government-owned nontactical vehicles such as sedans and commercial trucks. The maintenance included tune-ups and major parts replacement, but no major tear-down and rebuilding of vehicle systems. This work was transferred to the General Services Administration (GSA) two years after the original contract began. The maintenance portion also included the operation of the paint, wheel, and artillery shops. The transportation portion included the operation of the motor pool, operation of the base's rail head, and moving people and equipment into their houses and offices. The supply portion included the operation of the ammunition supply point, base supply, and the petro oil lubricant and gas station.

The original in-house organization expended a total of 597 work-years—524 civilian and 73 military—to perform the function. The MEO was 418 civilian work-years. The competition was unrestricted, negotiated procurement. The procurement was on a cost-plus award fee basis.

The decision was to convert the function to contract, based on the cost of performance. The contract began October 1, 1988. However, because of the lengthy period between the time the cost comparison was made and the contractor started work, adjustments had to be made to the contract cost. Contract costs were updated from the FY 1985 data used in the A-76 cost comparison to FY 1988 costs, and this resulted in a cost increase of \$7.7 million for the 5-year period. In the view of DoD officials at the time, these increases would have been the same for either contractor or the in-house operation.

Fort Sill has had two separate A-76 cost competitions—the first completed in 1988 and the second completed in 1992. The second cost comparison was performed because the Army believed that the initial contractor was exceeding the likely cost of in-house performance. The second cost comparison also resulted in a decision to contract the function out. The performance work statement for the second competition reflected a smaller scope of work than the first. For example, GSA-provided vehicles were excluded from the second competition; the operating hours for the supply center were reduced; the self-service store was eliminated; and overall workload has decreased. A new function, the core theater automated supply center (CETAs), was added to the scope. However, the base, along with other bases, has to bid for this work on a reimbursable basis. The CETAs-related workload at Fort Sill is adjusted accordingly to reflect the bids that it wins.

## Costs and Savings

The initial, or first, solicitation period, including the option periods that were exercised, covered 48 months with an initial start date of October 1, 1988. The estimated baseline costs of providing this function are estimated to be \$71 million over the period of performance. The estimated contract cost (including bid and estimated costs to the government) totaled \$58 million (these costs include the post-decision adjustments incurred due to the delay in contract award). The expected savings over the 48-month period were expected to total \$13 million or 18 percent.

As the validity of the original cost comparison values are questioned, we were unable to confidently identify the in-house bid for this competition.

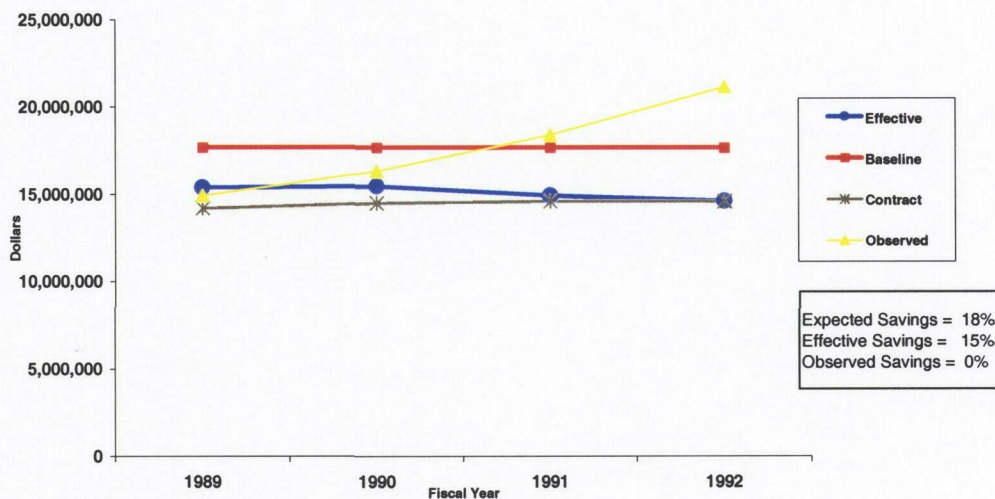
We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract scope and workload, as well as changes in wage determinations. For the most part, the changes in the first contract were for workload changes and one-time projects, especially for workload increases related to Desert Shield in 1990–1992. The changes to the second contract were primarily for changes in scope such as wage determinations and the addition of a vehicle preparation facility. The principal



changes to the third contract were for scope changes such as the addition of a HAZMAT center, a battery shop, and radiator repair services.

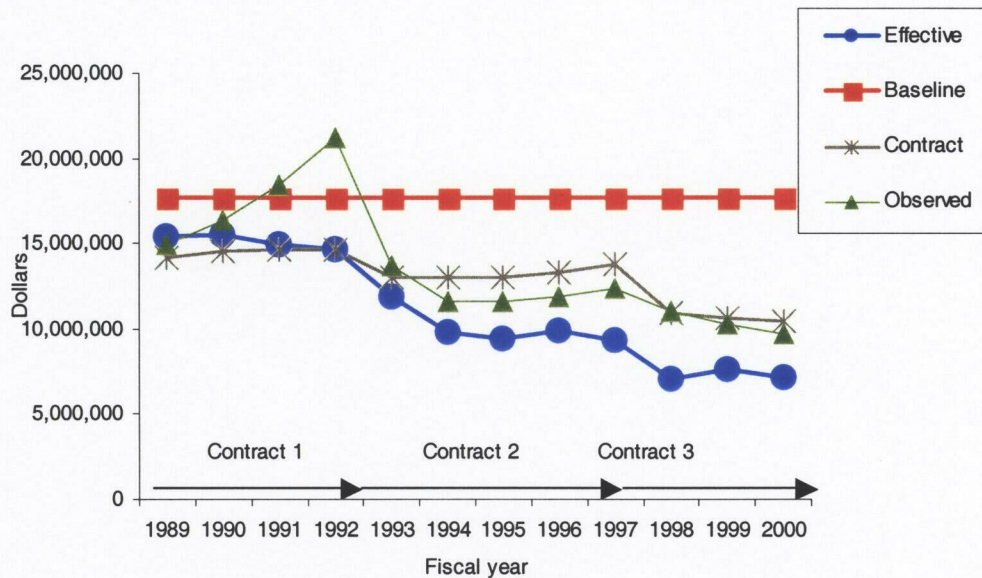
These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contracts' scope are summarized below. Figure 23 plots the costs for the first solicitation period. It identifies the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO). Figure 24 plots the same information for all solicitation periods.

Figure 23. Fort Sill, Logistics Services contract, first solicitation period



The first contract was expected to save 18 percent of the cost prior to competition. Once the adjustments had been made to account for one-time costs such as the build-up for Desert Shield/Storm and scope changes had been made that would have occurred even if the function remained in-house, the effective costs were 15 percent below the baseline cost prior to competition. The effective savings for the first year of the contract were 36 percent. With all the changes for

Figure 24. Fort Sill, Logistics Services contract, all contract periods



scope, workload, wage determinations, and one-time costs, there were no observed savings for the first contract. For the second and third contracts, the observed costs are within 4 percent of the annual bid costs, indicating very little cost growth over the period.

The contract has experienced changes in scope, workload, and wage determinations, as well as one-time changes. The most significant of these changes were:

- In FY 1989, workload decreases totaled \$1.287 million.
- In FY 1989, there were “out-of-target costs” of \$739 thousand.
- In FY 1990, workload decreases totaled \$502 thousand.
- In FY 1990, there were \$1.120 million in one-time scope increases for Desert Shield.
- In FY 1991, one-time increases for Desert Shield totaled \$3.616 million.
- In FY 1992, one-time increases related to Desert Shield totaled \$4.1 million.

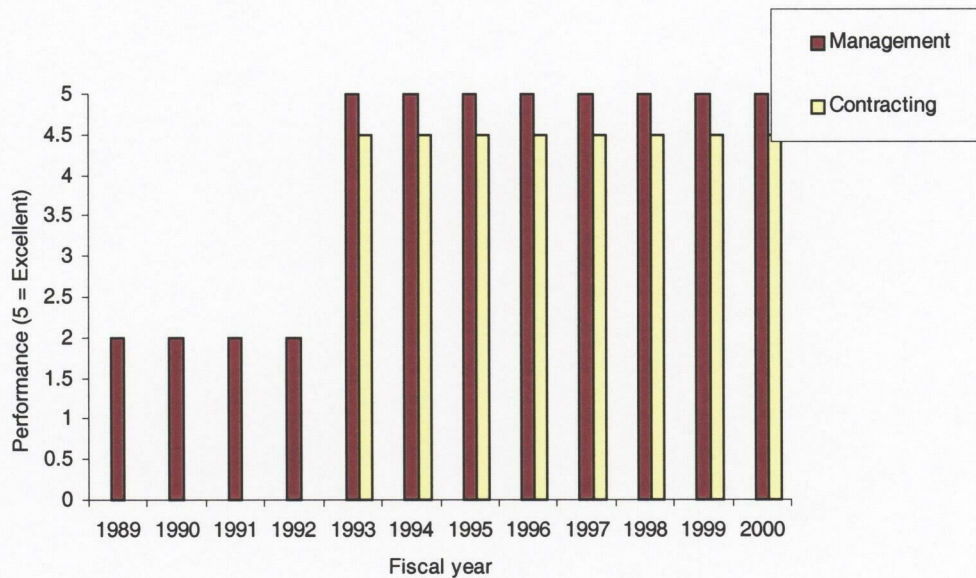
- In FY 1992, unspecified workload changes totaled \$1.247 million.
- A vehicle preparation facility was added to the scope of work in FY 1993 for an increase of \$121,765.
- In FY 1993, wage rates increased by \$130,882.
- In FY 1996, wage rates increased by \$304,291.
- In FY 1996, workload decreased by \$453,631.
- In FY 1997, wage rates increased by \$465,442.
- A Corps/theater ADP center was added for \$389,056 in FY 1997.
- In FY 1998, a Hazardous Materials Center and a Hazardous Substance Management System were added for \$148,746.
- In FY 1998, a battery shop, radiator repair service, and expendable supplies were added for \$503,529.
- In FY 1998, the projected workload decreased by \$512,247.

## Performance

We were able to interview management representatives associated with each contract and contracting personnel associated with the second contractor. We were unable to interview customers. Overall, the base personnel we interviewed were dissatisfied with the first contractor's performance but were very satisfied with the second contractor's performance. (The second contractor also won the third contract.) Figure 25 graphs their assessments. During the first contract, the management representatives were concerned that the contract was costing more than it should and that the contractor was always looking for opportunities to increase the contract scope and costs. They also felt that work often was not properly performed the first time and had to be repeated. Part of the explanation for this significant change in view between the first and second contractor's performance may be associated with the level of animosity and tension that spilled over from the original cost competition into the first contractor's period of performance. Throughout the first contract,

the contractor encountered suspicion and resistance. The government representatives we interviewed felt that the first contractor was unable to deal with the hostility that existed as a result of the cost competition. These tensions eased by the time of the second cost competition, and, in the view of the A-76 coordinator, there was a greater possibility for success. According to the contracting officer, the easing of tensions was due in some measure to the partnering conference that was held at the beginning of the second contract. The conference allowed all parties to identify their respective issues and positions and established a partnership environment that seemed to blunt the tension and the adversarial approach that characterized the first contract. In addition, the government representatives felt that the second contractor did a very good job technically and, in recent years, has improved his project management skills.

Figure 25. Performance: Fort Sill, Logistics Services contract



# **Grounds Maintenance: Randolph AFB (F0JTYMX29B)**

## **Background**

The Air Force announced the competition of its grounds maintenance services at Randolph AFB in March 1992. The competition began in May 1992 and was completed in August 1994. The function initially included grass cutting, weeding, and policing of debris for the base and Seguin airfield. The scope covered all common areas, runway grounds, and the grounds around empty family housing. Later, tree trimming, tree removal, and maintenance of the sprinkler systems were added to the scope. The government provided the equipment, but the contractor was to make any needed replacements.

The original in-house organization expended a total of 28 work-years to perform the function. The MEO was 28 civilian work-years. The competition was a negotiated procurement restricted to small business. The procurement was on a firm fixed-price basis. It received 11 private sector competitor bids.

The preliminary decision was to convert the function to contract, based on the cost of performance. The contract was awarded in August 1994, and work began February 1, 1995.

## **Costs and Savings**

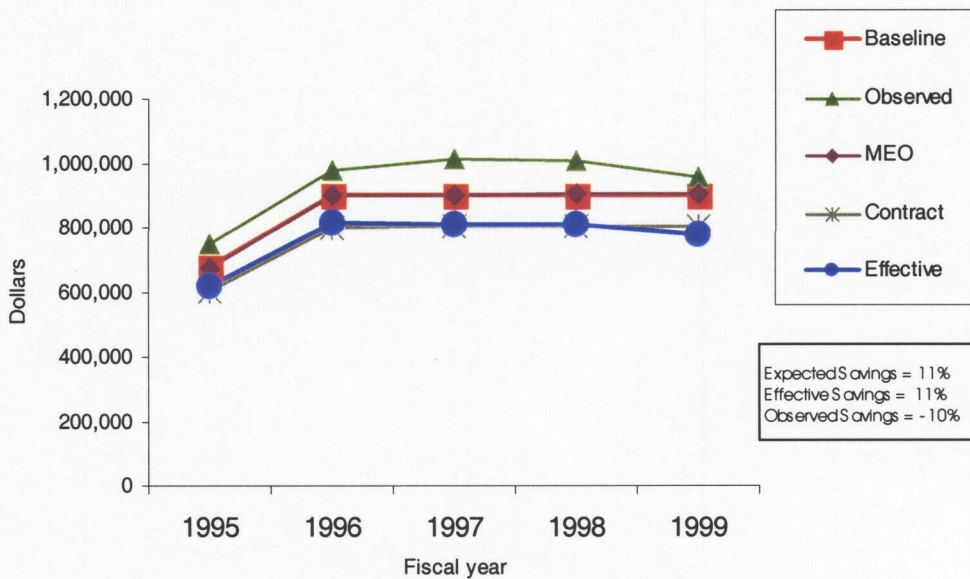
The initial total contract period, including option periods and extensions, covered 57 months with an initial start date of January 1995. The estimated baseline and government bid for this period is estimated at \$4.3 million. The estimated contract cost (including bid and estimated costs to the government) totaled \$3.8 million. The

expected savings for the first solicitation period were about \$0.5 million or 11 percent.

We examined the files to determine the observed cost of contract performance and found that there were modifications to the contract scope and workload, as well as changes in wage determinations.

These adjustments affect the cumulative cost of contract performance as well as increase the base cost for subsequent years. These adjustments to the contracts' scope are summarized below. Figure 26 plots the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

Figure 26. Costs: Randolph AFB, Grounds Maintenance contract, first solicitation period<sup>a</sup>



a. There has been only one solicitation period to date.

The contract was expected to save 11 percent of the cost prior to competition. Once the adjustments are made to account for one-time

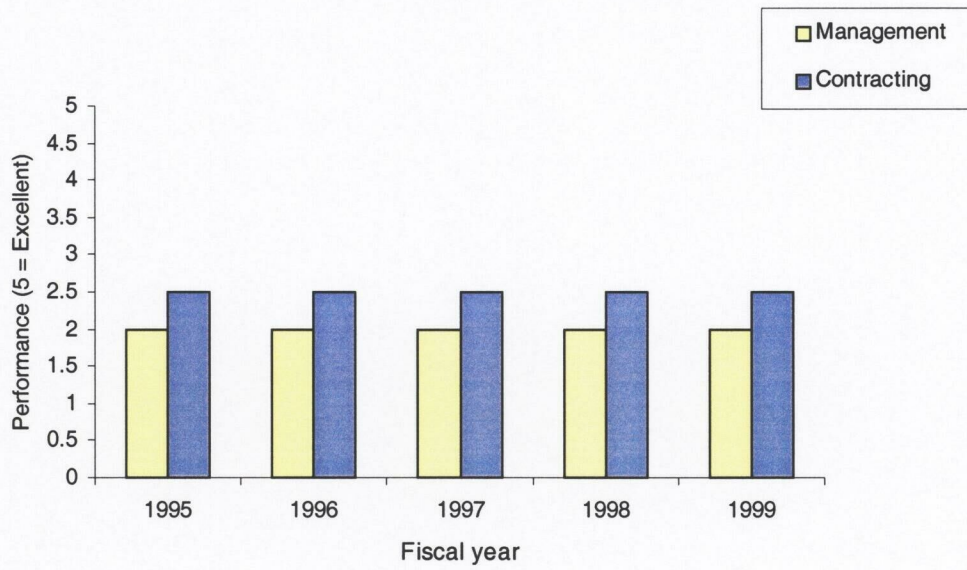
costs and scope changes that would have occurred even if the function remained in-house, the effective costs were also 11 percent below the baseline cost prior to competition. There was no real difference between the cost of the contract bid and the effective contract cost for the first contract. With all of the changes for scope, workload, wage determinations, and one-time costs, observed costs for the first solicitation period exceeded the precompetition baseline by 10 percent. Observed costs increased as a result of increased workload such as the addition of grounds to be maintained, increased tree trimming, additional litter patrol, and a revision to the airfield management plan. The revision to the airfield management plan involved reseeding certain grassed areas and changing grass heights to minimize the danger of birds to aircraft. The contract will be recompeted this year.

## Performance

We interviewed both management and contracting representatives assigned to the grounds maintenance contract. We were unable to interview any customers. Overall, the base personnel we interviewed were marginally dissatisfied with the contractor's performance. While in their view, the contractor did get the job done, there have been consistent problems throughout the solicitation period. For example, the contractor has never developed a satisfactory quality assurance plan and doesn't provide adequate management support for on-site personnel. A lack of cash flow prevents the contractor from keeping the equipment in good repair, and this results in schedule delays. Base management personnel have increased the frequency of their quality control meetings in order to address these performance problems. However, the contractor is always eager for new work and is responsive to unexpected changes in demand. Figure 27 graphs these performance assessments.

The contracting officer originally recommended against awarding the contract to this firm because he felt that the firm lacked the cash flow needed to do the work properly, but he did award the contract after the Small Business Administration gave the firm a Certificate of Competency. Because of ongoing performance problems, the contractor has been told that he will not be considered as a candidate when the contract is recompeted.

Figure 27. Performance: Randolph AFB Grounds contract





# **Grounds Maintenance: Davis Monthan AFB (F1CFBNV29)**

## **Background**

The Air Force announced the competition of grounds maintenance at Davis-Monthan AFB on August 4, 1983. The competition began in August 1983 and was completed in January 1990. The function included landscape maintenance, irrigation, removal of debris, litter patrol, and planting trees and scrubs. The scope covered the entire base, including the Aircraft Maintenance and Regeneration Center (AMARC) for a total of roughly 6,653 acres. AMARC stored excess aircraft and comprised about a third of the total acreage.

The original in-house organization expended a total of 34 work-years to perform these functions—9 military work-years and 25 civilian work-years. The MEO included 34 civilian work-years. The competition was restricted to small businesses, and the solicitation was issued as an invitation for bid (IFB). It received eight private sector competitor bids.

The decision was to convert the function to contract, based on the cost of performance. The contract for the first solicitation period was awarded in January 1990, and work began in February 1990. The contract was recompeted in 1994, and a second contract began in April 1995. A third contract was awarded in late 1999 with a contract start date of January 2000. Because the third contract had only been in effect for a month when we visited the base, we did not include it in our analysis.

The second contract was also a small business set-aside IFB. The contracting officer for the second contract felt that the contractor had severely underestimated the amount of labor required to perform the job and questioned his ability to meet the contract's financial

requirements. He recommended against award, but was overturned when the Small Business Administration (SBA) issued a Certificate of Competency (COC). Because of performance problems with the second contract, the installation elected to conduct a best value procurement for the third contract. The third contract also provides the incentive of adding two additional option years, for a total contract duration of 7 years, if the contractor's performance is good. There is no award fee.

## Costs and Savings

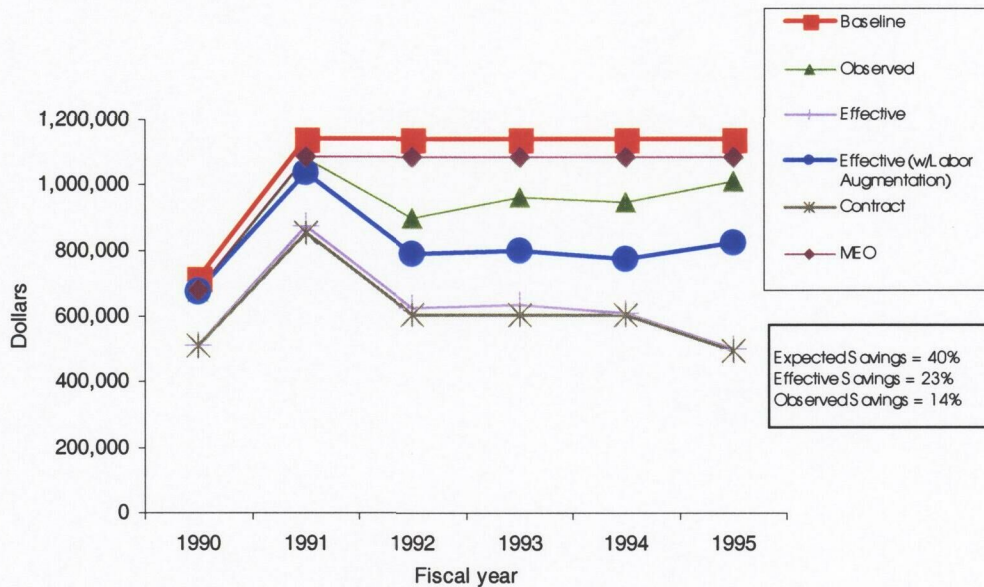
The first solicitation period, including option periods, covered 48 months with an initial start date of February 15, 1990. The baseline cost for this period is estimated at \$4.5 million over the performance period, the adjusted in-house bid was \$4.3 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$2.7 million. The expected savings for the first solicitation period (including any extensions) were about \$1.8 million or 40 percent.

We examined the files to determine the observed cost of contract performance. We found that there were modifications to the contract scope, workload changes, and changes as a result of wage determinations. There were also cost increases to exercise renewal options and to make funds for the renewal periods. These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contract's scope are summarized below. In addition, the base augmented the contractor's workforce with government employees because the contractors were not meeting the performance standards contained in the solicitation.

Figure 28 plots the costs for the first solicitation period. They include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO). Because the contractor's workforce was augmented with government employees, we have also

plotted the effective contract cost with the labor augmentation. Figure 29 plots the same costs for all solicitation periods.

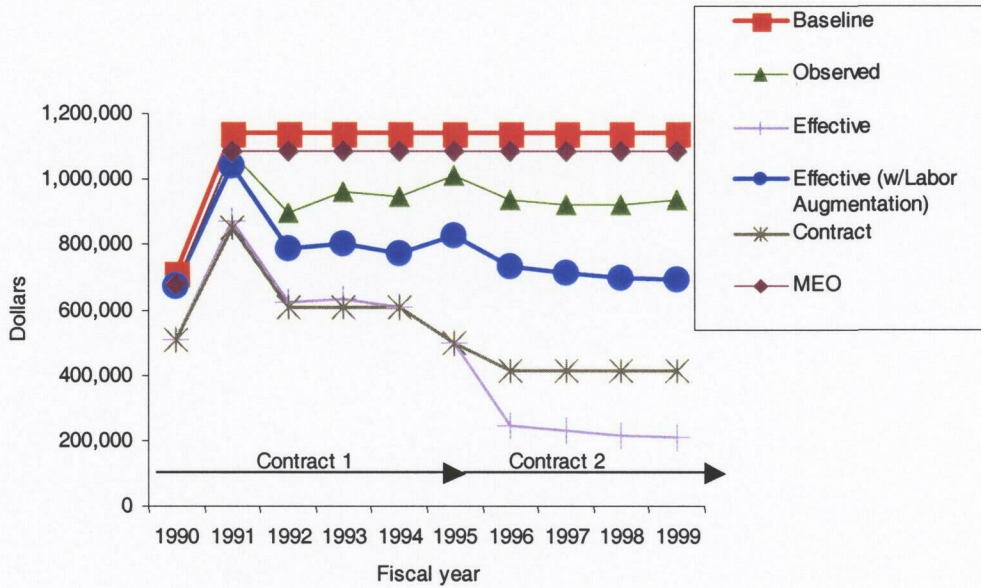
Figure 28. Costs: Davis Mothan, Grounds Maintenance contract, first solicitation period



The effective cost of the contract has decreased over the entire contracted period, FY 1990 through 1999. For the first contract, 1990–1995, the average observed costs were 14 percent below the baseline. The effective costs, including the base’s augmentation of the contractor’s workforce with government employees, were 23 percent less than the baseline. If the base had not augmented the contractor’s workforce, the average effective savings would have been 30 percent over the first contract. Even the observed cost, with labor augmentation, is below the baseline by 6 percent. For the second contract, 1995–1999, effective costs were less than they were for the first contract. This occurred even though there were slight workload increases, such as the increase in the amount of AMARC acreage to be mowed, during the second contract. Observed costs, with labor augmentation, increased slightly during the first year of the second contract but, by the second year, had settled back to about what they had been during the last years of the first contract. Interestingly, as the contractor’s bid decreased during the second contract, the

amount of labor augmentation seems to have increased proportionately. As a consequence, most of the apparent increased savings in the second contract was eliminated by the labor augmentation.

Figure 29. Costs: Davis Monthan AFB, Grounds Maintenance contract, all contract periods



Under both contracts, there were minor changes in scope and workload. The most significant of these changes were:

- The desired grass height around airfield was changed from 2 to 8 inches to 7 to 14 inches. This occurred in March 1990 as part of an Air Force-wide reassessment of optimum grass heights to minimize the danger of birds to aircraft.
- The amount of work required to maintain AMARC increased in 1991.
- The number of acres to be watered increased from 8 acres to 17 acres in 1991.
- The amount of policing for litter increased in 1992.

- A 40-acre park area was transferred from the installation to the city in 1993.
- Care of the landscape around the general's quarters was removed from the first contract.
- When the contract was recompeted in 1995, there was a switch from base-determined performance standards to command-determined standards.
- Over the life of the two contracts, the amount of improved acreage increased from 217 to 320 acres.

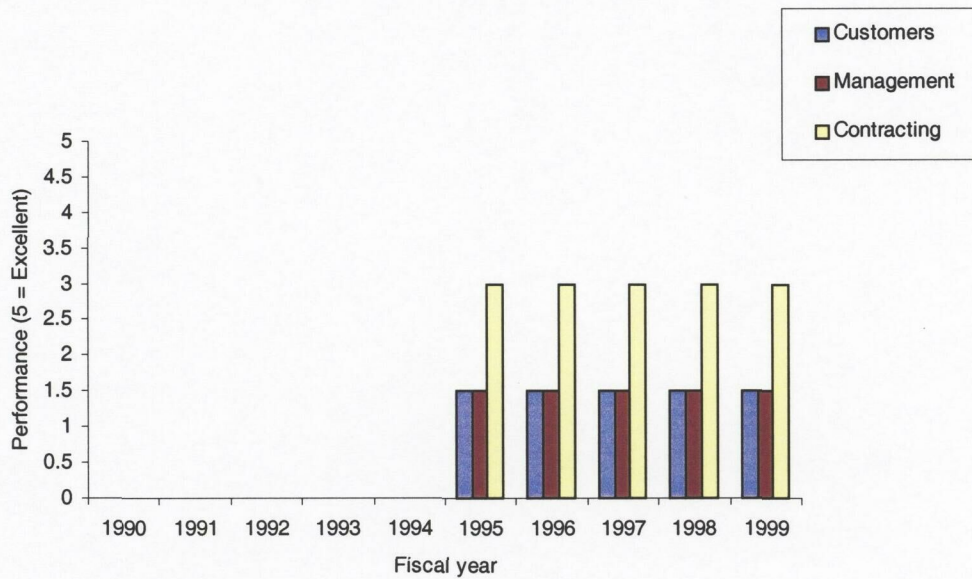
## Performance

The base personnel we interviewed felt that neither contractor met the performance requirements in their contracts. They felt that the first contractor lacked a quality control plan and that, as a consequence, the government had to perform the needed quality control checks. They also felt that the first contractor failed to provide adequate management of the contract, in large measure because the contractor was from out of state and the firm's principals never visited the base.

However, both the customers and the management and contracting officials we interviewed had had little direct experience with the first contractor and confined their formal evaluations to the second contractor's performance. As a result, the specific performance information shown in figure 30 is limited to the second contract. The customers and the management representatives were dissatisfied with the second contractor's level of performance. Typical among their complaints were that the contractor failed to complete his monthly maintenance schedule on time; failed to apply herbicide at the right time and thus was unable to control the weed problem in the desert landscaping; and failed to control the litter problem. AMARC had fires and work stoppages because the contractor allowed the grass to get too long. As a result, both management and customers had to supplement the contractor's workforce with their own people, both civilian and military, in order to meet the performance standards in the contract.

Extra manpower was also required when distinguished visitors were expected. The representatives from contracting gave the second contractor slightly higher marks because his quality control plan and paperwork were better than those of the first contractor. The contracting officer wrote the contractor letters of concern about the quality of his weeding, tree trimming, and application of herbicide in 1995, 1996, and 1998.

Figure 30. Performance: Davis Mothan AFB, Grounds Maintenance contract<sup>a</sup>



a. Performance information was not available for 1990–1994.

# Grounds maintenance: Keesler AFB (FOJMAHG29C)

## Background

The Air Force announced the competition of grounds maintenance at Keesler AFB on October 20, 1994. The competition began in October 1994 and was completed in September 1996. The function included grass cutting, irrigation, landscaping, storm clean-up, and litter patrol. The function covered roughly 900 acres.

The original in-house organization expended a total of 31 civilian work-years to perform the function. The MEO was also 31 civilian work-years. The competition was restricted to small businesses and was a sealed bid procurement. It received 21 private sector competitor bids.

The decision was to convert the function to contract, based on the cost of performance. The contract was awarded in July 1991 and work began October 1, 1991.

Keesler AFB has had two contractors and four separate contracts since the A-76 competition for the function was completed in 1996. The government decided not to extend the first contractor beyond the base year because of performance problems. Instead, it extended the first contractor for 6 months and began a recompetition for a new contractor. The recompetition took longer than anticipated, and the government extended the first contractor for another 6 months and then awarded it a 90-day contract. A second 90-day contract was awarded to the successor contractor before the second contractor was awarded a long-term contract in June 1999. The government furnished the equipment until 1999, but after that, the contractor was required to furnish the equipment.

## Costs and Savings

The initial total contract period, including option periods, covered 60 months with an initial start date of September 1996. However, the contract lasted only 24 months. Two 90-day contracts followed the initial contract. A fourth contract was awarded in 1999 with a full performance period of 51.5 months.

The baseline cost associated with the initial 24-month contract period totaled \$2.1 million, the adjusted in-house bid was also \$2.1 million, the estimated contract cost for this period totaled \$1.1 million. The expected savings for this 24-month period was about \$1 million or 48 percent.

We examined the files to determine the observed cost of contract performance and found that there were minor modifications to the contract scope and workload, as well as changes in wage determinations. For the most part, the changes to all the contracts were for wage increases and minor one-time projects. However, the changes in scope and level of specificity from the first contract to the fourth have significantly increased contract costs.

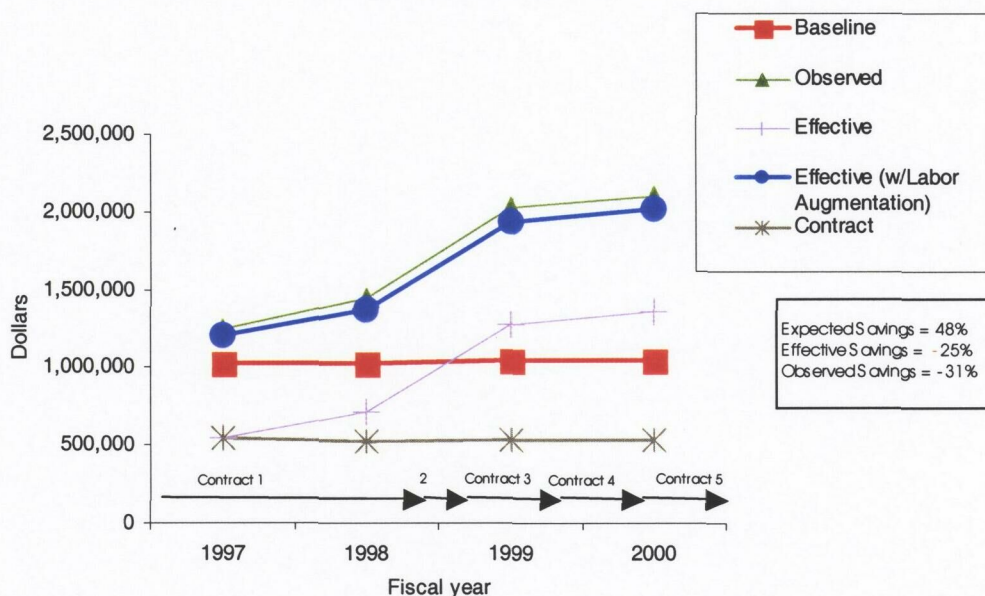
These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. These adjustments to the contracts' scope are summarized below. In addition, the base augmented the contractor's workforce with government employees because the contractors were not meeting the performance standards contained in the solicitation. Because of the series of short-term contracts, we plotted the costs for all the solicitation periods in figure 31. It plots the original baseline cost prior to competition; contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO). Because the contractor's workforce was augmented with government employees, we have also plotted the effective contract cost with the labor augmentation.

The first contract was estimated to save 48 percent of the cost prior to competition. However, because of performance problems and the subsequent augmentation of government labor, effective contract



costs were 25 percent over the government's cost to perform the function prior to competition, or baseline cost. These costs increased substantially during the two 6-month extensions that followed the first year of the contract. If the government had not augmented the contractor's workforce with government labor, the effective cost of the contract would have been 39 percent less than the baseline cost. The observed cost, with all of the scope and workload increases and labor augmentation, is above the baseline by 31 percent. Both effective and observed contract costs continued to grow at a rate of more than 5 percent a year during the two 90-day contracts and the current contract.

Figure 31. Costs: Keesler AFB, Grounds Maintenance contracts, all solicitation periods<sup>a</sup>



a. Baseline and MEO are equivalent.

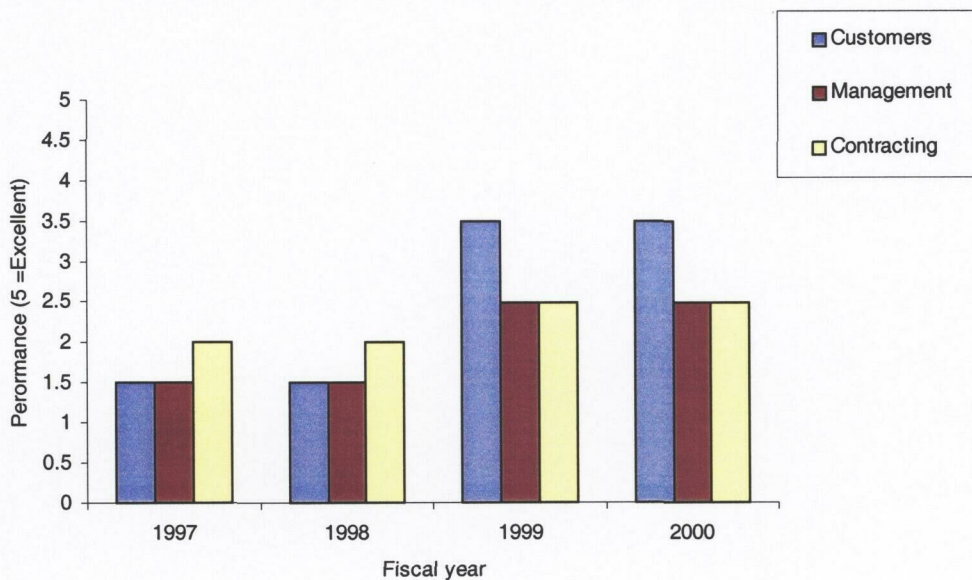
There were no major changes during the course of any individual contract. However, the performance standards changed between the first and second contractor. These changes, which occurred during peak growing season, involved changes in mowing standards from the number of cuts to grass height. The second contractor was also required to bring the base into standard within 30 days of the contract start. There was also a significant wage rate increase because the

casinos opening in the area increased wages for the entire community.

## Performance

Overall, the base personnel we interviewed were dissatisfied with the contractors' performance. (See figure 32.) Throughout the tenure of the first contractor, all representatives—customers, management, and contracting—stated that the performance was unsatisfactory. According to them, the contractor's major problem was that he could not keep the grass cut at the prescribed height of 2 and 4 inches. The contractor did not want to mow more than once a week. In a semi-tropical climate, once-a-week grass-cutting was not enough to meet the performance standards. The contractor also had trouble keeping up with the amount of weeding necessary. Management representatives believed that the first contractor underbid the contract and, as a consequence, would only perform functions when he was specifically requested to do so.

Figure 32. Performance: Keesler AFB, Grounds Maintenance contracts



In the view of both management and contracting personnel, the second contractor's performance is substantially better than that of the first, but they still do not believe they are getting good value for their money. They also believe that the second contractor needs to improve his quality control and develop a contingency plan to handle unexpected changes, such as an usually long rainy period. This contractor needed to provide and maintain more appropriate equipment and do a better job of keeping the trees pruned.

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# **Aircraft Maintenance: Laughlin AFB (F0JMXDP6C)**

## **Background**

The Air Force announced the competition of aircraft maintenance at Laughlin AFB on October 15, 1986. The contract was to cover maintenance and repair of T-37B, T-37A, AT-38B, and T-1A aircraft, engines, along with associated ground equipment. The scope covered both on- and off-equipment maintenance, as well as flightline maintenance.

The original in-house organization expended 979 work-years to perform the maintenance, 853 of which were military. The MEO included 583 civilian work-years—the number of billets authorized in the unit manning document (UMD). The competition was unrestricted and received 8 private sector competitor bids. The contract type was fixed price with incentive fee.

The preliminary decision was to retain the activity in-house based on the cost of performance. The preliminary decision was appealed but was upheld. The appeal did, however, result in an increase to the MEO of one position, revising the total MEO to 584 FTE. The final decision was made on January 10, 1989, and implemented on April 1, 1989.

The activity has never been recompeted. In 1994, after the MEO had performed the activity for 5 years, an internal analysis was performed by the Manpower Office at Laughlin AFB that indicated that the in-house workforce was operating within the MEO costs.

## Costs and Savings

The original solicitation period, including option periods, covered 54 months with an initial start date of April 1, 1989. As this in-house function has not been recompleted—meaning the original baseline functions and PWS are still valid—the total costs and savings can be evaluated over the FY 1989 through FY 1999 time period.

The baseline cost for the period of analysis is estimated at \$301 million, the adjusted in-house bid is estimated at \$180 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$162 million.<sup>2</sup> The expected savings for the period of analysis are estimated at \$121 million or 40 percent.

We examined the manpower and budget documents to determine the observed cost of the in-house performance over the period. Changes to the in-house bid were made based on an Air Education and Training Command (AETC) formula, which is based on changes to the estimated number of flight hours.<sup>3</sup> Figure 33 plots the costs for the first solicitation period. Because the function was never recom-

2. The differential between the in-house and contract bid was less than 10 percent; therefore, the function remained in-house.
3. The formula for determining the number of needed FTE MEO was  $[\text{MHFH} \times \text{Flying hours}/87.06] \times 1.15 \times 1.10 = \text{Total requirements}$ . Man-hour per flying hours (MHFH) costs are standard for each aircraft (6.7 for the T-37 and 12.3 for the T-38). 87.06 is 60 percent of the military man-hour availability factor (MAF) of 145.1. The MAF is the average number of hours per month an employee will be available for primary duties in the work center. This number is multiplied by 1.15 to account for such things as shop support, time awaiting parts, transportation, and training. This number is then multiplied by 1.10 to account for the Deputy Commander for Maintenance's staff. As of August 1999, the revised formula is  $\text{Manpower adjustments} = (\text{Flying-hour impact} * \text{Flying-hour dollar cost}) \backslash \text{Laughlin average annual civilian salary}$ . Flying-hour impact is the baseline hours minus the AETC PA projected hours. The flying-hour dollar cost is calculated by dividing the Laughlin average annual civilian salary by the Manpower availability factor and then multiplying that result by the Man-hour per Flying hour factor (5.4 for T-1, 5.3 to T-37, and 9.9 for T-38).

peted, figure 33 also plots costs from the first solicitation period to the present. The costs plotted include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an “apples-to-apples” comparison with the baseline; and the cost of the in-house bid (MEO).

Figure 33. Costs: Laughlin AFB, Aircraft Maintenance contract, first solicitation period

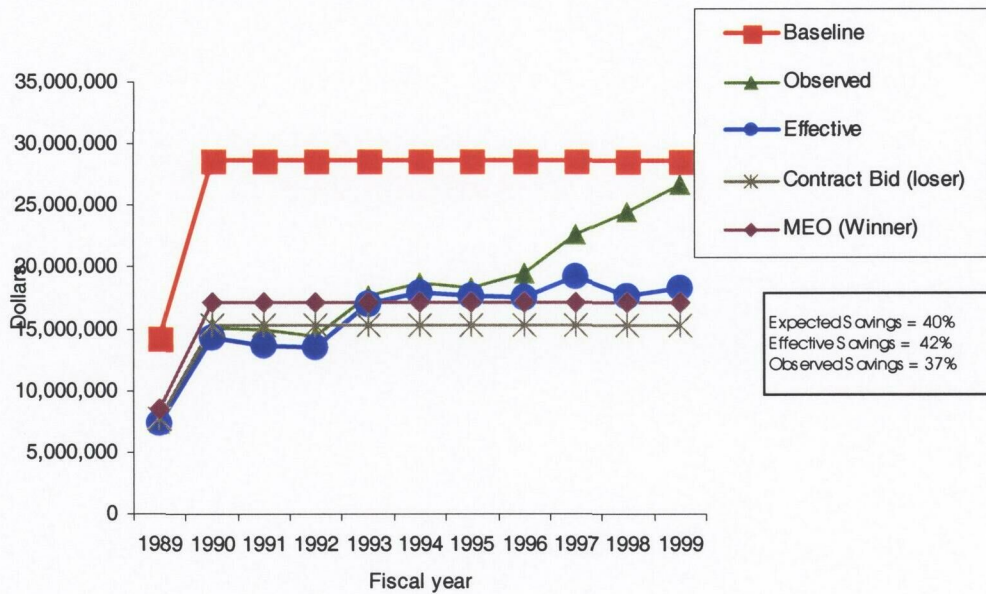


Figure 33 shows that the effective savings were actually slightly higher than the expected savings over time. Based on the cost comparison, savings were expected to be 42 percent, but once all the adjustments were made to ensure an “apples-to-apples” comparison over time, the effective savings were 42 percent. This increase in savings occurred early in the performance period, and, since 1993, effective costs have been slightly higher than the MEO. If this trend continues, effective savings will begin to decrease. Observed savings over the period are 37 percent. Observed costs too are increasing over time, especially since 1996. This sharp increase in observed costs is primarily because of a significant increase in the number of flying hours which have

added 100 additional work-years since 1996. We summarize the major changes to the base cost of the in-house bid below:

- A decrease in flying hours in April of 1992 because of fewer student pilots reduced the number of authorized FTE by 59. The revised MEO was 525 FTE. There were 544 employees actually assigned to the activity at this time (518 permanent and 26 temporary employees).
- A similar decrease in flying hours in July 1994 reduced the authorized workforce by another 32 FTE.
- Five FTE were added in September 1994 to accommodate the transfer of some jet engine repair from Randolph AFB.
- In March 1996 and September 1996, 40 FTE and 42 FTE, respectively, were added to the MEO because Reese AFB closed and its training mission was transferred to Laughlin AFB.
- In October 1996, the repair of jet engines was competed on a regional basis. The competition was won by a contractor, located at Laughlin AFB. As a consequence, the MEO lost 45 FTE. In addition, plastic media blasting was transferred to Randolph AFB at the beginning of the month, thereby reducing the MEO by 7 positions.
- The revised MEO at the end of October 1996 was 531 FTE. There were actually 582 employees on board (503 permanent and 79 actual).
- There was an increase in the number of flight hours in August 1997 and October 1998, which increased the MEO by 86 FTE and 20 FTE, respectively.
- As of September 30, 1999, the revised MEO was 649. There were 574 permanent and 62 temporary employees actually assigned to the activity.

## Performance

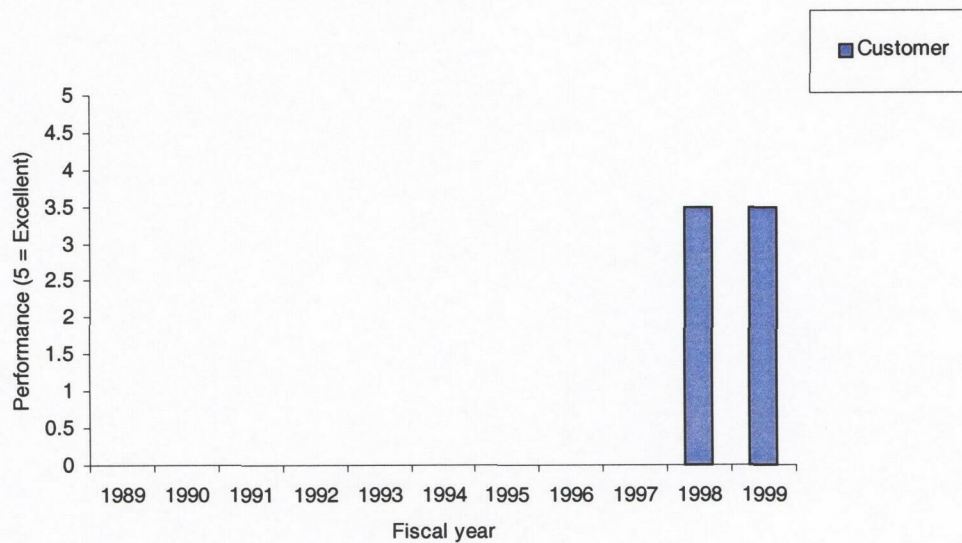
Interviews with current customers indicate that while, in their view, the in-house performance of the specialists who perform the major



repairs is excellent, the work on the flightline has been only average or somewhat below. Lately, AETC headquarters has become concerned about the level of Laughlin's performance in the future. Laughlin's workforce is largely ex-military, and they are approaching retirement age. Even with a high school training program for aircraft mechanics, the local labor pool is very small and may not be able to adequately replace current workers as they retire. In addition, the training aircraft assigned to Laughlin are aging and are requiring increased maintenance. These two factors have combined to reduce the level of Laughlin's performance, and AETC representatives are concerned that there will be turbulence as new planes are introduced into Laughlin's fleet and with the need to train and "grow" a skilled workforce.

Figure 34 graphs the customers' assessment of performance. No contracting personnel were interviewed because the function was retained in-house. Although we interviewed management personnel, we cannot include their assessment because they were, in essence, evaluating their own performance.

Figure 34. Performance: Laughlin AFB, Aircraft Maintenance contract



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# **Aircraft Maintenance (Transient Alert): McChord AFB (F1LPQWY61)**

## **Background**

The Air Force announced the competition of transient alert aircraft maintenance at McChord AFB on August 4, 1983. The competition began in August 1987 and was completed in June 1991. The function included parking and refueling transient aircraft, as well as pre-flight checks and routine flightline maintenance such as tire changing, replacing filters and gaskets, and tightening nuts and bolts. The scope covered all aircraft visiting the base including fighter, commercial, and Presidential aircraft.

The original in-house organization expended a total of 33 work-years to perform these functions—12 military work-years and 21 civilian work-years. The MEO included 21 civilian work-years. The competition was restricted to small businesses, and there were seven private sector competitor bids.

The preliminary decision was to convert the function to contract, based on the cost of performance. The preliminary decision was appealed, but the appeal was rejected. The contract was awarded in June 1991, and work began in October 1991. The contract was re-competed in 1995, and a second contract awarded in May 1996.

## **Costs and Savings**

The original total contract period, including option periods and extensions, covered 55 months with an initial start date of October 1, 1991. The baseline cost for this full period is estimated at \$9.1 million, the adjusted in-house bid was \$4.4 million, and the estimated contract cost (including bid and estimated costs to the government) totaled

\$2.9 million. The expected savings for the first solicitation period (including extensions) were about \$6.2 million or 68 percent.

We examined the files to determine the effective and observed costs of contract performance and found that the only modifications to the contract were for changes in wage determinations. There were also cost increases to exercise renewal options, and to make funds for the renewal periods. These adjustments affect the cumulative cost of contract performance and increase the base cost for subsequent years. Figure 35 plots the costs for the first solicitation period. They include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an “apples-to-apples” comparison with the baseline; and the cost of the in-house bid (MEO).

Figure 35. Costs: McChord AFB, Transient Alert Aircraft Maintenance contract, first solicitation period

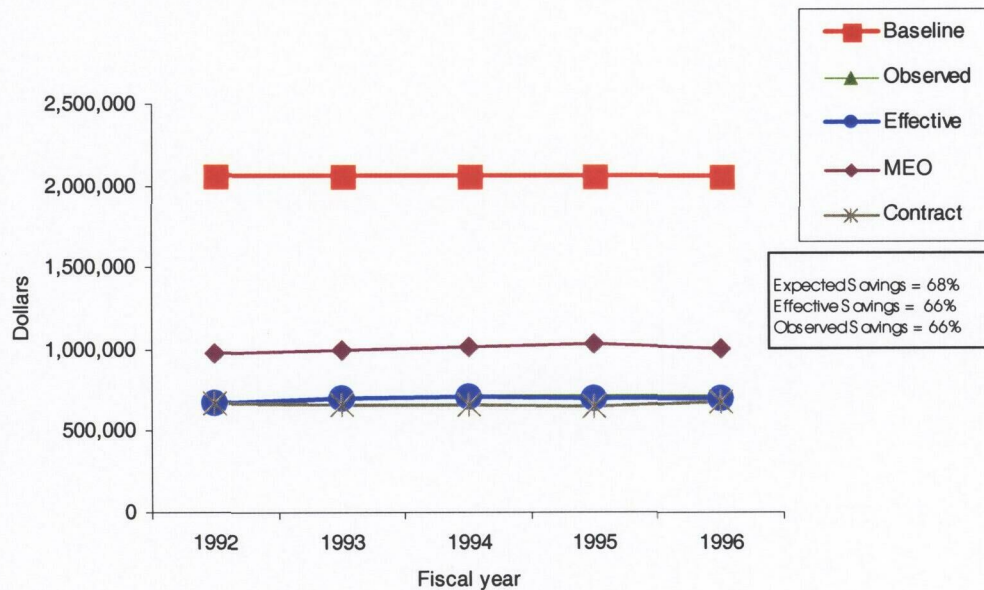
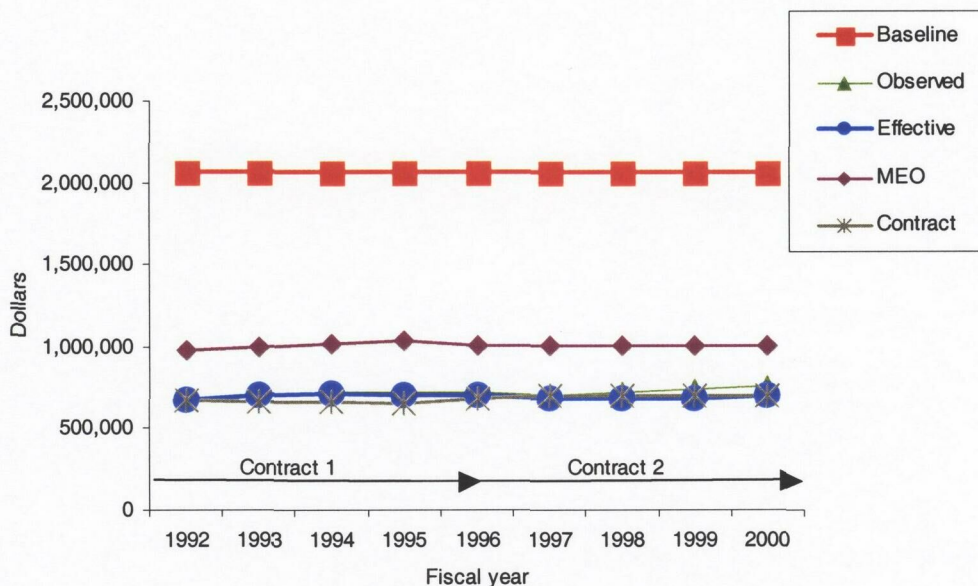


Figure 35 shows that the actual cost of the contract has been stable over the entire contracted period, FY 1992 through 1999. Both the

effective and observed contracts cost was 66 percent below the estimated baseline cost for the duration of the first contract, FY 1992 through FY 1995 and the first three quarters of FY 1996. During the first year of performance, the savings were 58 percent. During the second contract period, workload has decreased slightly, and the successor contract has reflected the decreased workload with decreased costs. As a result, effective costs were slightly lower than bid costs by the end of the period. We see in figure 36 that there is only a 6-percent difference between the contractor's bid cost and the observed cost during this period.

Figure 36. Costs: McChord AFB, Transient Alert Aircraft Maintenance contract, all contract periods



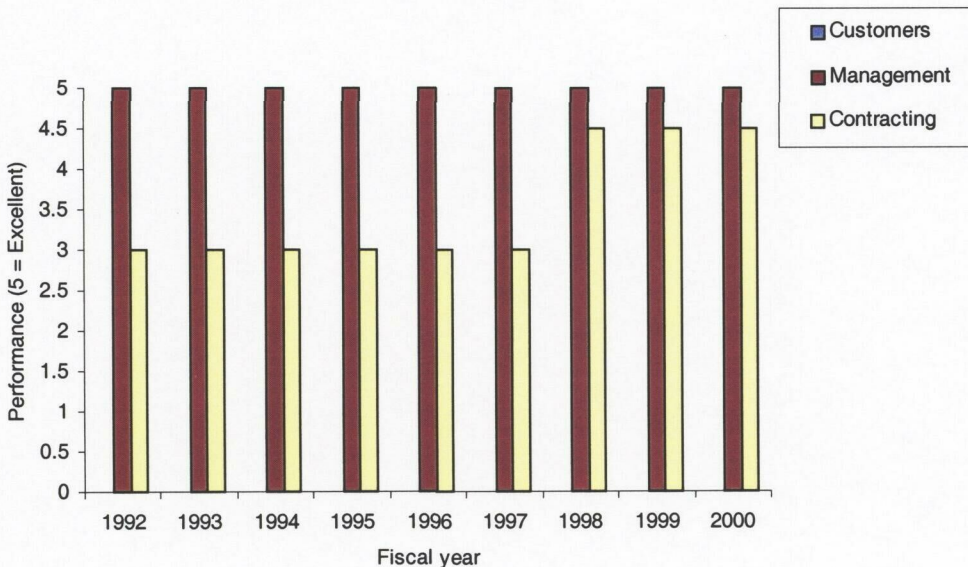
## Performance

Figure 37 shows that management representatives found the in-house performance to have been excellent throughout the performance period. They have been very pleased with the contractor's performance, believing that it has been a good value for the money. There was a slight dip in responsiveness during the transition period. There was an initial problem with the QAEs, but this was rapidly overcome.

According to management, the initial QAEs were military and had never been QAEs before. They were evaluating the contractor's performance using the same standards that they would have used if they were supervising military personnel. Once these evaluators were given QAE training and it was explained to them that a different evaluation process was to be used, the problems dissipated.

One reason the management representatives and contracting officer gave for the relatively smooth transition was that the contractor hired the government employees who had been performing the function. The contracting officer rated the second contractor higher than the first contractor because, in her opinion, the second contractor has better management practices than the first one. The management and QAE representatives felt that the contractor performance was equally high on both contracts because the contractor personnel were very responsive and had a great deal of pride in their work. We were unable to interview customers because of their transient nature.

Figure 37. Performance: McChord AFB, Transient Alert Aircraft Maintenance contract



# **Vehicle Operations and Maintenance: Peterson AFB (F1STDKA62)**

## **Background**

The Air Force announced the competition of vehicle operations and maintenance at Peterson AFB on May 23, 1985. The competition began in June 1987 and was completed in April 1988. The function included vehicle operation, including shuttles and taxi service, and maintenance of 204 general-purpose and 185 special-purpose vehicles. Special-purpose vehicles included fire engines, snow removal equipment, front-end loaders, and dump trucks. Vehicle maintenance excluded work on GSA vehicles, glass or body work, or painting of the vehicles.

The original in-house organization expended a total of 99 work-years to perform these functions—65 military work-years and 34 civilian work-years. The MEO included 73 civilian work-years. The competition, which was negotiated and unrestricted, received 8 private sector competitor bids.

The decision was to convert the function to contract, based on the cost of performance. The contract was awarded in April 1988, and work began in July 1988. There was a contractor protest of the decision, but it was not sustained.

## **Costs and Savings**

The original total contract period, including option periods, covered 51 months with an initial start date of July 1, 1988. The baseline cost for this period is estimated at \$14.4 million, the adjusted in-house bid was \$10.6 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$7 million. The expected

savings for the first solicitation period were about \$7.4 million or 51 percent.

The contract was resolicited in 1992 and again in 1996. The motor vehicle function was combined with the supply function in the second resolicitation. We have excluded the second resolicitation from our analysis because separating the costs of these two functions was not possible.

We examined the files from the first solicitation to determine the observed cost of contract performance. We found that there were modifications to the contract scope and workload and changes as a result of wage determinations. There were also cost increases to exercise renewal options and to make funds for the renewal periods. Most of the changes were for increases in wage rates and minor changes to shuttle schedules. These changes were not major, but they affect the cumulative cost of contract performance and increase the base cost for subsequent years.

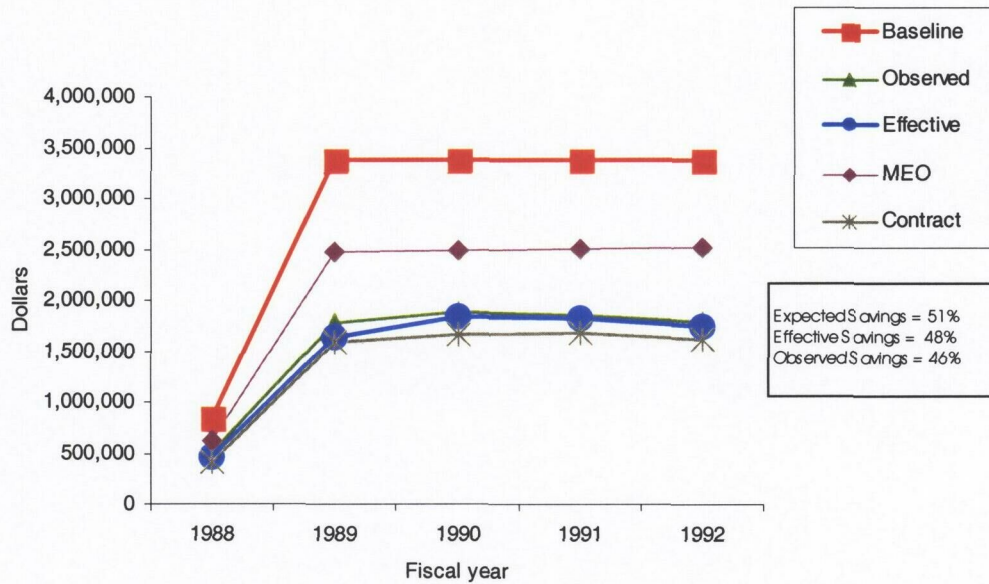
Figure 38 plots the costs for the first solicitation period. They include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an “apples-to-apples” comparison with the baseline; and the cost of the in-house bid (MEO).

The contract was estimated to save 51 percent of the cost prior to competition. The average effective cost of the contract is 48 percent below the baseline. During the first year of the contract, the effective costs were 65 percent below the baseline. This represents a 16-percent decrease in the contractor’s original bid for the first year because the historical workload contained in the solicitation was higher than the actual work performed by the contractor. Even the observed cost, with all of the scope and workload changes, is below the MEO and is below the baseline by 46 percent. There were no major changes to the contract scope or workload during the first contract.

Figure 39 plots the contract costs for the first and second contract periods. The first contract ended at the end of December 1992; the second contract begins in February 1993. Unfortunately, the base



Figure 38. Costs: Peterson AFB, Vehicle Operations and Maintenance contract, first solicitation period



failed to extend the first contract to provide continuous contract coverage. As a result, the function was performed in-house for the intervening 3 months. The dip in contract costs in figure 39 is caused by the lack of continuous contract coverage. There is only a 3-percent annual difference between effective costs and contract bid for the second contract.

## Performance

As we see in figure 40, the base personnel we interviewed were satisfied or very satisfied with the second contractor's performance. Unfortunately, there were no personnel available who were familiar with the first contractor's performance. The customers were satisfied with the contractor's timeliness and quality and felt that complaints were handled in an adequate manner. The contracting officer was also very satisfied with the contractor's performance. There were no contract discrepancies until the end of the contract period. At that time, performance slipped slightly, in the view of the contracting officer, because the contractor realized he would not get the follow-on contract. Even so, the contractor never fell below 90 percent in meeting his performance standards.

Figure 39. Costs: Peterson AFB, Vehicle Operations and Maintenance contract

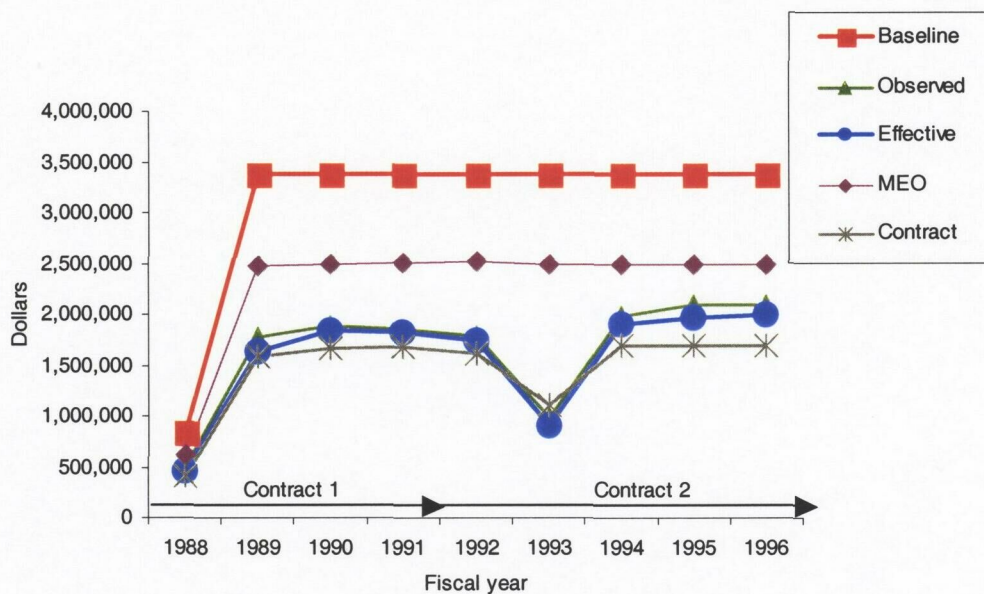
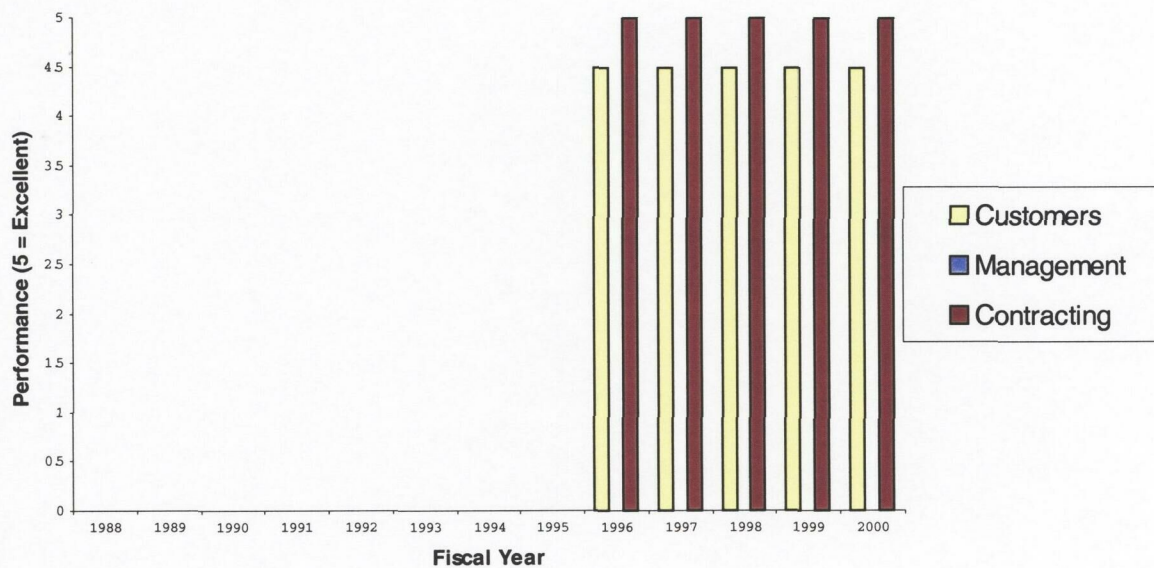


Figure 40. Performance: Peterson AFB, Vehicle Operations and Maintenance contract



# Visual Information: Fort Rucker (A6463)

## Background

The Army announced the competition of its visual information services at Fort Rucker on February 26, 1986. The competition began on November 15, 1989, and was completed in February 1991. The function included construction of artwork and devices such as exhibits and scale models; production of graphic art for both audiovisual and television needs; and provision of still photographic services, as well as television, audio, and visual information services. It also included the preparation of the Training Service Center (TSC) catalogs and bulletins, provision of visual information library services, and indoor and outdoor presentation support.

The original in-house organization expended a total of 79 work-years to perform these functions—7 military work-years and 72 civilian work-years. The MEO included 46 civilian work-years. The competition was restricted to small businesses and was a negotiated procurement. It received five private-sector competitor bids.

The preliminary decision was to convert the function to contract, based on the cost of performance. The contract was awarded in July 1991, and work began October 1, 1991. This was a firm fixed-price contract.

The contract has been recompeted twice since the initial competition. The second contract was awarded in September 1995 to the same contractor who won the first contract, and lasted for 4 years. The third contract, which went to a different contractor, was awarded in June 1999 and was to start October 1, 1999. We did not include the third contract in our analysis because it had only been in effect for a few months at the time of our visit.

## Costs and Savings

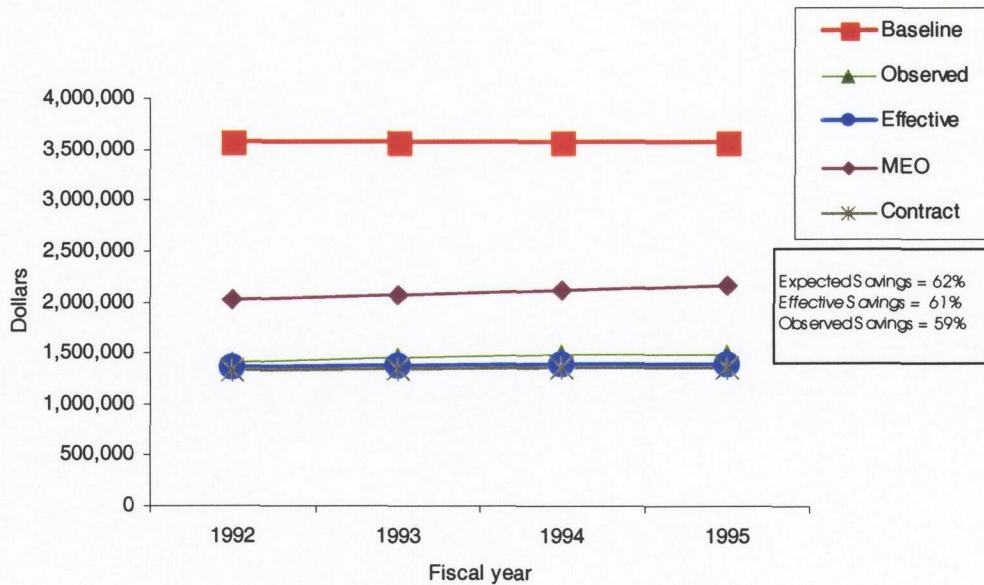
The first solicitation period, including option periods, covered 48 months with an initial start date of October 1, 1991. The baseline cost for this period is estimated at \$14.3 million, the adjusted in-house bid was \$8.4 million, and the estimated contract cost (including bid and estimated costs to the government) totaled \$5.4 million. The expected savings for the first solicitation period were about \$8.9 million or 62 percent.

We examined the files to determine the observed cost of contract performance. We found that there had been minor modifications to the contract scope, workload changes, and changes as a result of wage determinations. To exercise renewal options and to make funds available for the renewal periods. For the most part, the changes to the first contract were for wage increases and minor one-time projects. The only significant change in scope occurred in the first year of the contract. In February of that year, the pricing schedule for off-site work was changed. There were no major changes in scope or workload during the second contract.

These adjustments affect the cumulative cost of contract performance and increase the contract cost for subsequent years. These adjustments to the contract's scope are presented below. Figure 41 plots the costs for the first solicitation period. These costs include the original baseline cost prior to competition; the contract cost as it was originally bid; the observed contract cost, including all contract modifications; the effective contract costs once adjustments were made to ensure an "apples-to-apples" comparison with the baseline; and the cost of the in-house bid (MEO).

The contract for the first solicitation period was expected to save 62 percent of the cost prior to competition. Contract costs were very stable over the first solicitation period. The average effective cost of the contract to date is 61 percent below the baseline. Even the observed cost with all the scope and workload increases is below the baseline by 59 percent. In figure 42, we use the same cost curves to provide a cost profile for all solicitation periods. During the second contract, FY 1996–1999, both the effective and observed costs

Figure 41. Fort Rucker, Visual Information Services contract, first solicitation period



continued to decline. The effective cost of the second contract was 1 percent less than the contract bid. The large expected savings rate was, in large measure, due to the transition to more sophisticated design and production equipment at the time of the competition. Through the use of new technology, large savings in labor costs were realized.

## Performance

As we see in figure 43, the base personnel we interviewed were satisfied with the contractor's performance. The customers were consistently satisfied with the products they received during the first contract and felt that the performance improved during the second contract. The contracting officer and the personnel managing the contracts also felt that the contractor's performance improved during the second contract. The management representatives we interviewed had been concerned during the first contract that the products, although they were excellent and met the performance requirements, were not the "pieces of art" that had been produced when the function was performed in-house.

Figure 42. Costs: Fort Rucker, Visual Information Services contract, all contract periods

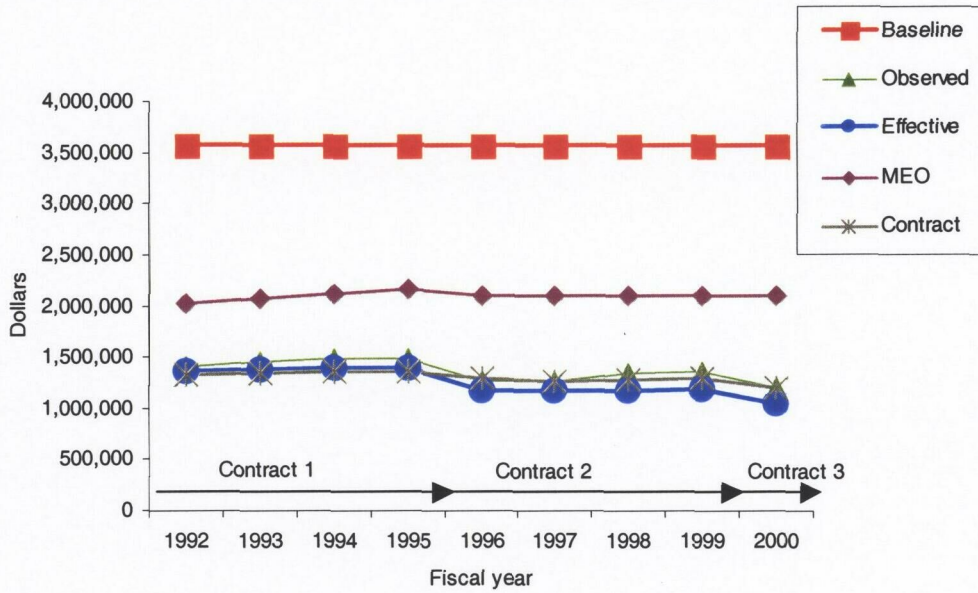
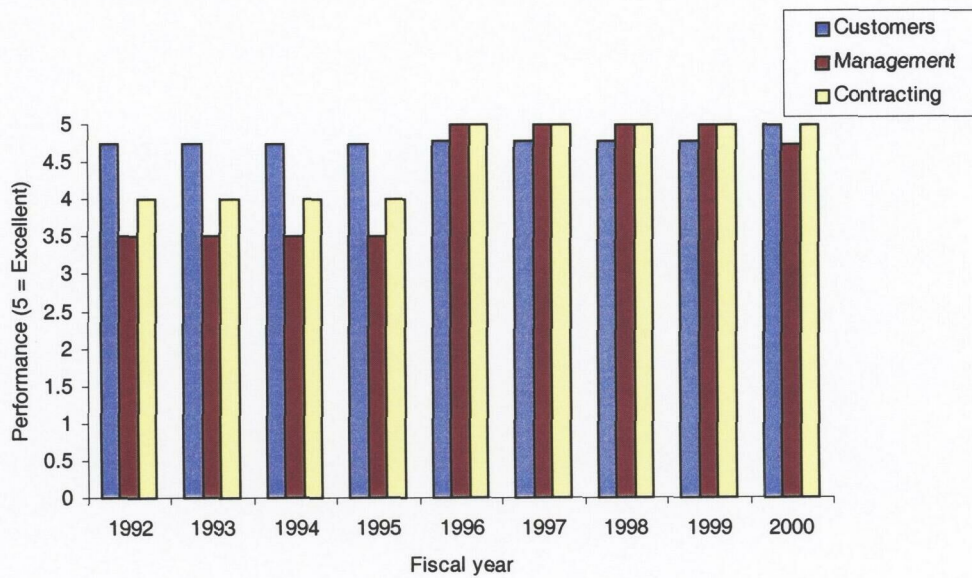


Figure 43. Performance: Fort Rucker, Visual Information Services contract<sup>a</sup>



a. The annual contract values for the endpoints were estimated based on partial year contract costs.

## Appendix: Methodology

To determine whether there are long-run cost savings from competitive sourcing, we examined commercial functions that had been competed between 1988 and 1996. Our intent was to be able to review the full and actual costs to perform these functions for at least the full solicitation period specified in the A-76 competition. We also examined the extent to which management, customers, and contracting officers were satisfied with the resulting performance.

This section outlines the methodology used in our assessment of costs and performance, lists caveats and assumptions, and discusses the problems and limitations of the data that are available. Our approach covers the following steps:

- Competition selection
- Data collection
- Data analysis.

We performed our review between August 1999 and July 2000.

### Competition selection

Most of the studies that evaluate the effectiveness of competitive sourcing do so through the study of savings 6 months to one year post-competition. To add to and expand this body of knowledge, our initial goal was to review functions that were competed at least 4 years ago, where data were available for, at minimum, one full solicitation period. Ideally, we wanted to examine functions that had been competed for 10 or more years. We used the process described below to select the competitions included in our review.

### Criteria

Forty-nine competitions fit our criteria for review. The functions included operations support (BOS), facilities/ housing operations

and maintenance; vehicle operations and maintenance; logistics or supply operations; visual information services; and aircraft maintenance. The competitions included 25 contract wins and 24 in-house wins and were distributed among the Army, Navy, and Air Force. We used the following criteria:

**Timeframe: 1988 to 1996**

All of the competitions we examined were completed between 1988 and 1996. Because contract files are typically destroyed 6 years after contract-closeout, we could not go further back than 1988. Comparable documents for in-house wins are often destroyed even sooner. Competitions that were completed after 1996 were excluded because we wanted to be able to review the actual costs for at least the performance period specified in the initial competition. Since the inception of the DoD competitive sourcing program, roughly 2,200 competitions have been completed. By selecting the time frame of 1988 to 1996, this pool of competitions was reduced to slightly more than 300.

**Competitions at closed installations eliminated**

We eliminated all competitions that took place at installations that were later closed or had a major realignment because there was a high probability that the relevant documentation would have been destroyed or lost.

**Competitions with 20 or more FTEs**

We excluded competitions with fewer than 20 FTEs because these competitions typically generate smaller cost savings.

**Balance between contract and in-house wins**

We also wanted to choose functions that had a history of both contract and in-house wins so we could identify any differences in cost and performance trends.

**Functions that have some relevance for future competitions**

Many of the earlier competitions covered functions such as key punch operations or telephone switchboards. We excluded these types of functions because, for the most part, these functions are not part of



the current competitive sourcing inventory and examining them would have little relevance for future competitions.

### **Functions that had several competitions, preferably in more than one Service**

We excluded functions where there had only been a few competitions because we would not have been able to draw any conclusions at the functional level. Initially, we set the lower limit at six competitions with at least three Services represented. We subsequently had to relax this criterion to at least five competitions with at least two Services represented.

## **Telephone screening**

Before we visited an installation to interview personnel and review documents, we first called the installation to ensure that the relevant documents would be available. This initial screening eliminated 27 competitions from our sample of 49 because the data were either unavailable, too old, or too disorganized for our review. Seventeen of the competitions that were eliminated at this stage were in-house wins.

## **Data collection**

### **Installation interviews**

After telephone screening, we visited installations to conduct interviews and collect competition data. During these visits, we interviewed installation personnel who routinely came in contact with the function that had been competed—functional managers; quality assurance evaluators; customers; and, if the competition was a contract-win, contracting personnel and the contractor. We used a structured interview form designed to gather both information on competition cost and performance. The goal of the interview process was to gain an understanding of:

- The tasks being conducted within the function and what tasks, if any, differ from a traditional perceptions (i.e., identifying any unique characteristics of the function).

- The history of the competition. Whether there were any specific problems with the cost comparison or competition process, any protests, and the number and types of bidders.
- Any major changes in how the function was provided pre- and post- competition. For example, in one visual information services competition, the annual outlay for government-furnished equipment increased significantly at the time of competition. Therefore, due to technology increases, the post-competition function could be provided with significantly less labor.
- The major changes to workload during each solicitation period. For example, in one aircraft maintenance function, changes in the required number of flying hours at the installation increased workload significantly.
- The major changes to scope during each solicitation period. For example, in one vehicle operations contract, the operation of a bus route was added, thereby increasing the scope of the work performed under the contract.
- The major one-time cost changes during each performance period.
- The quality of the performance of the function and whether performance has changed during the period of performance.
- Any additional costs to the government not identified in the cost comparison or contract documentation. For example, in some grounds maintenance functions, military labor was being used to augment the contract workforce. Through these interviews, we identified the level of effort and, therefore, the total cost of this additional labor.

## **Documentation review**

During each site visit, we reviewed all available documentation on the cost and performance of the function. Documentation review included: the competition documentation (PWS, cost comparison, correspondence, bids, protests); all post-competition contracts, modifications, and purchase orders (if contract-win); budgets; audit and

manpower reports (if in-house win); and performance reviews. We also obtained relevant workload information if it was available.

After our site visits were completed, we had to drop an additional 8 competitions from our cost and performance analyses because of insufficient or incomplete data. This reduced the number of competitions that we ultimately evaluated to 16.

## Supplementary data

In addition to the site visits and interviews, we obtained additional data to verify and augment the data collected at the installation. These supplementary data included audit reports, data from Service-wide information systems, and private-sector cost data on comparable functions.

## Data analysis

Once we had gathered cost and performance data on the selected competitions, we analyzed them to determine whether actual costs were more or less than had been originally estimated and whether performance met the level specified in the competition. The goal of this analysis was to examine whether the expected level of savings from A-76 competitions can be achieved and maintained over the long run without affecting the quality of services provided.

## Tracking cost changes

### Pre- and post-competition costs

To determine whether the expected level of savings from A-76 competitions can be achieved and maintained over the long run without affecting the quality of services provided, the annual costs of a function, post-competition, must be isolated and tracked over each solicitation and compared with pre-competition costs. To have an accurate comparison between the *full* pre- and post-competition costs, components of cost must be isolated and defined.

- *Pre-competition costs.* Throughout this study, we have made comparisons between a function's annual costs and its

pre-competition, or baseline, costs. In the past, there has been a concern that baseline per-billet cost estimates are too high. To address these concerns, we have used the MEO cost per billet (as reported in the cost comparison) and applied this ratio to the pre-competition billets to estimate baseline costs. This provides a more conservative estimate, and assumes that the cost per billet, both before and after the competition, is the same.

- *Post-competition costs.* Post-competition costs include the total direct cost of providing the service plus any indirect costs to the government. The direct cost of providing a service is the contract price in the case of a contract win and the cost of meeting the MEO in the case of an in-house win. Indirect costs include contract administration costs, one-time conversion costs (amortized over the first solicitation period), and any other costs. All calculations of post-competition costs include both the direct and indirect costs of providing the service.

#### **Tracking post-competition costs**

The total costs estimated on the cost comparison form for each year in the first solicitation period do not actually correspond to what was spent on an annual basis. Often, there are changes in the demand for a particular function, as well as changes in the specific tasks that are to be conducted. However, these changes are not part of the A-76 process, and they would have occurred whether or not the function was competed. By isolating the components of total costs, we can track increases and decreases in cost and determine whether changes would have occurred if the competition had never been conducted. Therefore, to evaluate contract costs, we looked at the funds available for each year of the contract and tracked the modifications made during the year. For in-house wins, we tracked annual costs from budget and manning documents with estimates for the impact of changes during the year. The components that affect annual cost are defined as follows:

- *Scope changes.* These are changes in the original set of functions defined in the PWS. Examples include adding facility painting to a maintenance contract that had been limited to minor repair or eliminating the self-help stores from a supply con-

tract. If the scope of a contract changes during the first year, funding in all subsequent years of the contract may reflect this change.

- *Workload changes.* There are changes in the level of effort required under the PWS. Examples include an increase in the number of acres to be managed under a grounds maintenance contract or a decrease in the number of passenger vehicles to be maintained under a vehicle maintenance contract. After a workload adjustment, funding for all subsequent years of the contract can reflect the impact of this change in workload.
- *One-time cost changes.* These are adjustments in scope or workload that only affect the current year of the contract. For example, one installation suffered major damage from a hurricane. The contracts for facility maintenance and grounds maintenance at this installation were modified to allow extra workers to be brought in to clean up the debris and rebuild. However, because this was expected to be a one-time effort, funding in subsequent years of the contract was not increased.
- *Wage determinations.* At any time during the contract, the Department of Labor may decide to raise labor rates, or rates may be raised under the Service Contract Act. Wage increases will affect not only the current year of the contract, but all subsequent years as well. Wage increases are also calculated for in-house wins.
- *Cost adjustments.* At any time during the contract, the unit cost of materials may change. For example, increases in fuel costs will increase the costs of performing shuttle services under a vehicle operations contract. This type of cost increase would affect the cost of providing this service whether it was performed in-house or under contract. We have assumed that an increase or decrease in unit price would continue throughout the contract period.
- *Labor augmentation.* Under certain contracts, particularly those where poor performance was an issue, government labor was brought in to bolster the effort. Through interviews with customers and management, we estimated the size of this

workforce and developed fully burdened rates for this labor on an annual basis. In other cases, the total number of personnel involved in managing the function was larger than what was estimated in the cost comparison. Through interviews, we also estimated the fully burdened cost of this additional labor force.

## Comparing costs and savings

The annual costs of a function are the funds made available to conduct that function at the start of the fiscal year, plus or minus adjustments made during the year, and, for contract wins, the total costs to the government from contract administration and management including QAEs. These are the annual costs observed by the government for the provision of the function.

To determine how these costs compare with what was “bid” in the cost comparison relative to the original PWS, adjustments for changes in workload, scope, unit cost, and wage changes must be accounted for, not only in the year in which they occurred, but for all subsequent years as well. To this end, if in a given year, there is an increase in scope costing \$50,000, it is expected that funding for each of the remaining years will be \$50,000 higher than what is projected in the cost comparison form.<sup>4</sup> This increase in cost reflects the provision of additional effort, not an increase in the cost of providing the original functions defined in the PWS. Therefore, to ensure an apples-to-apples comparison of the cost of providing the original set of functions, the \$50,000 for additional workload would be subtracted from the funds available for each subsequent year of the contract.

To determine whether savings were achieved for the 16 competitions, we evaluated and compared costs and savings from three perspectives: *expected*, *observed*, and *effective*. Using this approach allows us to separate and evaluate the costs of meeting the tasks described in the original PWS, and assess how costs are affected by changes in scope, workload, and other adjustments.

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4. Adjustments that are made mid-year are annualized for all subsequent years (e.g., it is assumed that a \$20,000 change in scope that affects 6 months of a given year will affect each subsequent year by \$40,000).

## Definition of terms and method of calculation

The terms we used and our method of calculation are defined as follows:

- *Expected costs* are what the government expects to pay for the provision of a commercial function after a competition is completed (e.g., the price of the winning bid plus all administrative costs to the government). *Expected savings* are estimated as the difference between what the government expects to pay and the pre-competition costs of providing the function. *Expected costs* and *savings* are forecasts based on the winning contract or MEO bid at the time of competition and can be incorporated into out-year budget decisions.

The expected cost is given by the following formula:

$XC$  = Expected costs. The annual costs the government expects to pay for a given year

$C$  = The total winning contract bid (or MEO) for a given year

$A$  = The total administrative and other costs to the government as reported on the cost comparison form for a given year. (Note: one-time conversion costs are annualized across the first solicitation period)

- *Observed costs* are what DoD actually spent for the provision of services. Observed costs include increases or decreases to annual costs from changes in scope, workload, wages, and one-time cost adjustments. *Observed savings* are the difference between the pre-competition annual cost to the government and the actual or observed costs of that function after the competition was completed.

The observed cost is given by the following formula:

$OC$  = Observed cost. The annual cost the government is required to pay for a given year.

$F$  = Actual funds made available for a given contract or MEO at the start of a given fiscal year.

$A$  = The total administrative and other costs to the government as reported on the cost comparison form for a given year. (Note: Conversion costs are annualized across the first solicitation period.)

*S* = Total annual increase or decrease in cost due to scope changes for a given year.

*D* = Total annual increase or decrease in cost due to workload changes for a given year.

*O* = Total annual increase in cost due to one-time cost changes for a given year.

*W* = Total annual increase or decrease in cost due to periodic changes in wage rates prescribed by the Department of Labor or the Service Contract Act.

*P* = Total annual increase or decrease in cost due to changes in the unit cost of materials.

*L* = Total annual increase in cost due to labor augmentation for a given year.

- *Effective costs* are the estimated costs to DoD of providing the *same set* of services as originally identified in the cost comparison. Effective cost estimates exclude cost changes that would have occurred whether or not the function was competed. For example, in one competition the *observed* costs of providing services increased by over 15 percent from 1991 to 1992. This increase was due to additional workload needed to support our military in the Persian Gulf. This increase in workload, and therefore cost, would have occurred whether the necessary services were provided by in-house or contract labor. Therefore, the *effective* costs for 1992 would be adjusted to remove these one-time costs. By adjusting the data to exclude workload, scope, wage, and one-time costs, effective cost estimates allow us to compare changes in cost while keeping the original scope constant. Effective savings are defined as the difference between the pre-competition annual cost to the government and the effective costs of that function after adjustments are made. Comparing *effective* and pre-competition cost estimates provides insight into true cost growth or savings.

Based on the observed cost and expected cost formulas above, the effective cost is determined by the following formula:

where the effective cost (EC) for a given year is equal to the observed costs of the function less the cumulative impact of all scope, workload, wage and price adjustments occurring since contract inception and less the one time



cost changes and labor augmentation for the year of calculation only.

Effective costs are the most meaningful indication of whether an A-76 competition was successful in producing real and sustained savings because they identify the costs of providing the same scope of work over time. However, it is also important to examine changes in observed costs because, historically, these are the types of costs people have looked at when examining the value of the competitive sourcing program.

## **Caveats and assumptions**

During our analysis, we had to make some assumptions in isolating such factors as the effects of scope or workload changes, the amount of contract administration or augmentation of contract labor by government labor, or minor discrepancies between authorized and expended funds. In all cases, we chose to be conservative and decided in favor of the alternative that would limit rather than increase savings.

### **Scope and workload changes versus one-time cost increases**

It was sometimes difficult to determine the difference between these two changes. When in doubt, we tried to guess conservatively—deciding in favor of a change in scope rather than a one-time change. However, if it was in fact a one-time change, then future years adjusted (effective) costs will be lower than we show them.

### **Baseline costs**

If the baseline FTE billet estimates provided by the Services are for a set of functions other than the set described in the PWS, baseline estimates will be wrong, and this will affect the savings estimates provided in this study. We have assumed that baseline billets are correct and are for the same set of functions described in the PWS.

## **Labor augmentation**

These estimates were based on estimates provided to us during our interviews with relevant customers and contract personnel. To our knowledge, there are no documented data in this area.

## **Annualizing costs**

If a contract or an MEO was modified 6 months into the solicitation period, we doubled the cost of the modification for subsequent years. However, certain modifications occur mid-year but actually cover the full year. We have tried to be conservative in our estimates and identify as many of these situations as possible. A good example of this type of modification is in the grounds maintenance area. If a change in scope occurs in January, well before the growing season, the cost change is likely to be in effect for the whole year, and we have treated it as such.

## **In-house wins**

We included only two in-house wins in our analysis because good documentation of the post-competition costs was very scarce. These two wins are probably a self-selecting group and because good documentation exists, we can probably assume that the functions are well managed. As a result, they may demonstrate higher savings than we would have found had we been able to analyze a larger sample of in-house wins. The contract wins we analyzed may also be self-selecting because we dropped 11 contracts from the analysis due to missing data or because the contracts were later combined with other contracts and it became impossible to track changes in cost. Most of the contracts that we dropped because of missing data were the earlier contracts—those awarded in the late 1980s. The data for these contracts had been lost. As a general rule, contract wins are much less likely to be self-selecting because procurement requirements mandate complete documentation of all changes to a contract. Therefore, even poorly managed contracts could be included in our sample.

## **Wage changes**

We have assumed that wage changes for contract and in-house labor would have been similar. We would have preferred to evaluate the difference in wages between contract and in-house workforces, but wage determinations were often coupled with other adjustments in scope or workload. Thus, we could not isolate the impact of wage changes from that of other changes.

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