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# Price-Based Acquisition

Issues and Challenges for  
Defense Department Procurement  
of Weapon Systems

Mark A. Lorell, John C. Graser, Cynthia R. Cook

Prepared for the United States Air Force

Approved for public release; distribution unlimited



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## Preface

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This document reports RAND Corporation research findings on the use and potential benefits of price-based acquisition (PBA) for Department of Defense (DoD) procurement of major military-unique systems. PBA is a major acquisition reform measure that seeks to reduce costs and enhance acquisition efficiency. Its core concept is the procurement of goods and services through a commercial-like market pricing approach rather than the traditional, heavily regulated, cost-based DoD approach using certified cost or pricing data.

The research findings are based on extensive structured interviews both with government cost estimators, contracting officers, and other senior acquisition officials representing all four major Air Force product centers and other stakeholders, and with numerous private-sector officials representing defense contractors involved in major PBA-like programs. They are also based on a review of more than 30 case studies of programs with important PBA-like features.

Because PBA is a broad and often misunderstood concept, a key aspect of this research was development of a systematic taxonomy of the PBA-like approaches used by DoD. This taxonomy served to organize the case study assessment and as an aid in integrating the findings from the structured interviews.

This report should be of interest to cost and price analysts, contracting officers, acquisition policymakers, and other senior acquisition officials interested in acquisition reform and new approaches to contracting and to providing incentives for contractors so as to achieve the best value in defense procurement.

This research was sponsored by Lt Gen John D. W. Corley, Principal Deputy, Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQ), and conducted within the Resource Management Program of RAND Project AIR FORCE. The technical point of contact was Mr. Jay Jordan, Technical Director, Air Force Cost Analysis Agency (AFCAA).

## **RAND Project AIR FORCE**

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## Summary

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This report presents findings from a research study conducted by RAND Project AIR FORCE, a division of the RAND Corporation, to examine the effects of using price-based acquisition (PBA) approaches for the development and production of major Air Force weapon systems, subsystems, and other military-unique articles. Typically in these cases, the cost-based acquisition (CBA) approach is used—i.e., the price to develop and produce such an article is based on cost data that the government requires the contractor to provide. Critics of this traditional, CBA method see it as imposing heavy regulatory burdens on the government and the contractor and tending to discourage potential non-defense contractors from competing for government contracts, thus reducing competition and quality and increasing cost. By contrast, PBA is seen as

a way to buy goods and services that does not rely primarily on a supplier providing cost data. . . . In its purest form, PBA results in a firm-fixed-price . . . contract and a fair and reasonable price is established without obtaining supplier cost data (Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 1999b, p. 7).

Currently, PBA is a major acquisition reform tool, one that many senior Department of Defense (DoD) officials have advocated as a means of improving cost, schedule, and performance outcomes. DoD has considered the use of PBA in major defense acquisition programs (MDAPs) for several years. Interest in reforming the

defense acquisition system to make it more cost-effective intensified in the late 1980s, as research and development (R&D) and procurement budgets continued to decline from the peak years of the Reagan administration. The end of the Cold War and the expectation of much steeper cuts in the defense budget accelerated these trends. Early in 1994, then Secretary of Defense William Perry launched a major new series of acquisition reform initiatives aimed at achieving a defense acquisition system that would be more flexible, lower cost, smaller, and more agile. In doing so, he explicitly pinpointed three items as being among the most important drivers of the DoD “regulatory cost premium” paid for defense procurements: the government collection of certified cost or pricing data as required by the Truth in Negotiations Act (TINA), the imposition of burdensome government-unique cost accounting and reporting systems, and government cost oversight and audits.

These initiatives spurred a growing interest in PBA among acquisition reform advocates. In their view, DoD had, over the years, developed a culture and procedures that required contractors to provide more cost data than were necessary to make informed decisions on what price should be paid for a particular weapon system. This bureaucracy created additional work not only for contractors, which had to collect and provide cost data at excruciating levels of detail, but also for DoD evaluators, who had to analyze everything submitted in each contractor’s proposal. Proponents of PBA argued that it would alleviate these problems by offering shorter schedules, higher quality, and reduced costs. PBA would allow the government to lower the price it pays for goods and services by way of the following mechanisms:

- **Reduced overhead burden.** DoD’s reduced need for cost analysis, proposal evaluation, audits, cost data collection, and contract management and oversight would save overhead costs. Contractors would see a reduction in overhead costs for proposal preparation, cost collection and reporting, and support to DoD contract management and oversight.

- **Share in savings.** Contractors could retain a portion of any savings achieved through implementing greater efficiencies as additional profit under a fixed-price contract, which would increase their incentive to further lower costs over time.
- **Enhanced civil-military integration.** More civil/commercial competitors would be attracted, which would encourage greater competition, and there would be greater access to lower-cost nondevelopmental items and innovative civil/commercial technologies (see pp. 10–14).

Based on these potential benefits, DoD and Congress took limited steps in the 1980s and 1990s to implement aspects of PBA in some major weapon programs. In October 1998, then Under Secretary of Defense for Acquisition, Technology, and Logistics (USD [AT&L]) Jacques S. Gansler commissioned a major internal study to analyze implementation of PBA on a much broader DoD-wide basis. The resulting PBA study group published a report at the end of 1999 that included numerous detailed implementation recommendations (Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 1999b). Late in 2000, Gansler circulated a memorandum for the secretaries of the military departments supporting the PBA study group's report and strongly endorsing the more extensive use of PBA throughout DoD<sup>1</sup> (Gansler, 2000). The focus on PBA remained strong following the November 2000 presidential election; PBA was seen as a key acquisition tool supporting the Bush administration's goals of transforming the U.S. military.

Despite these initiatives, however, PBA remains controversial. Many people in the acquisition community continue to question the means and scale of PBA's claimed benefits. Critics have also advanced a significant list of challenges and potential pitfalls arising from PBA, including the following:

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<sup>1</sup> As we discuss in the report, there was some disagreement among the participants on the final recommendations.

- The lack of adequate market indicators (especially competition) for military-unique products.
- A workload shift from the contractor in proposal preparation to the DoD cost and price analysts who must determine a “fair and reasonable” price based solely on “market” information.
- The government’s greater difficulty in assessing the credibility of contractors’ pricing methodology.
- The increased risk of “excessive profits” or “price gouging.”
- The requirement for major statutory changes for full implementation (see pp. 14–18).

The most compelling critique of PBA, however, is that it assumes a market structure and market dynamics that do not exist in the defense marketplace for truly noncivilian commercial items, particularly for sole-source defense-unique items.

Unfortunately, a lack of empirical data about the implementation of PBA has made it difficult for policymakers to know whether PBA ultimately holds the benefits that are claimed for it and what challenges truly exist. This study was carried out to provide more concrete data for policymakers and to promote a better understanding of how DoD can best use PBA approaches.

## **Research Approach**

The researchers conducted structured interviews with government cost estimators, contracting officers, other senior acquisition officials representing all four major Air Force product centers, other Air Force stakeholders, and numerous private-sector officials representing defense contractors involved in major PBA-like programs. The researchers also reviewed more than 30 case studies of programs with important PBA-like features. Seven major questions about the benefits and challenges of PBA were examined:



1. Is there documented evidence that prices paid for major DoD weapon systems or defense-unique items have been reduced through the use of PBA as compared with CBA?
2. Is there documented or anecdotal evidence that PBA has reduced contractor overhead rates or charges?
3. Is there evidence that using PBA rather than CBA has shortened the acquisition process?
4. Is there evidence that the DoD acquisition workload has been reduced through the use of PBA?
5. Is there evidence that additional competitors (at the prime, sub-contractor, or supplier levels), particularly companies that do not normally do business with DoD, have participated in DoD procurements as a result of PBA?
6. Is there documented evidence that the use of PBA has measurably increased contractor incentives to reduce cost through commercial-like incentive mechanisms?
7. What are the lessons learned for the future application of PBA? (See pp. 26–28.)

## Findings

The researchers found that, overall, it is extremely difficult to prove that PBA results in significant savings in either cost or time compared with CBA. It is even more difficult to quantify such savings. Specific findings are as follows:

- **It is difficult to precisely measure the effects of PBA on cost or schedule in most major DoD acquisition reform pilot programs.** PBA has not been implemented as a lone policy initiative on such programs but, rather, in conjunction with a variety of other reform measures. It is nearly impossible to isolate the effects solely attributable to PBA from the effects of companion measures or other aspects of programs that are totally unrelated to PBA. DoD provides no direction for tracking cost or schedule savings from PBA or, indeed, any other acquisition reform

measure, in a systematic and a methodologically convincing way. Consequently, such data are not collected by either DoD or by contractors (see pp. 56–60).

- **While most contracting experts believe that at least some overhead and contract management savings accrue from PBA, little compelling quantifiable evidence is available to back up the claim.** Potential overhead and contract management savings from the use of PBA for DoD MDAPs have probably been overstated and are likely to be modest (see pp. 60–70).
- **Although PBA probably shortens some aspects of the contracting and oversight process, no clear quantifiable evidence that PBA is decisive in shortening acquisition schedules was found.** The lack of such evidence largely stems from the fact that the multitude of factors most decisive in influencing acquisition schedules are unaffected by PBA. However, schedule savings appear to have occurred under PBA when pre-priced production lots were coupled with the initial award of a development contract following a multi-contractor R&D competition. In such instances, processing the contracts for the follow-on production lots proved to be a streamlined process because prices had been established earlier under the competitive downselect for development (see pp. 70–78).
- **On certain types of programs with long-term pricing agreements, the elimination of the requirement for TINA certified cost data and the use of PBA reduce both government and contractor workload, but on a small scale.** The scale of these reductions is difficult to quantify. Eliminating the requirement for all cost data of any type, however, does not appear to save workload; and it raises major difficulties for DoD analysts and contracting officers who must make a determination of “fair and reasonable” pricing, especially in sole-source award situations (see pp. 78–83 and 89–95).
- **There is very little convincing evidence that the use of PBA has encouraged greater numbers of civilian commercial firms to compete for DoD contracts for major military-unique items, either on the prime or higher subtier levels.** Therefore,

it appears that PBA has not significantly reduced costs, shortened schedules, or raised quality through the promotion of greater civil-military integration of the industrial base (see pp. 107–124 and 132–135).

- **It is difficult to discern the role of PBA alone in increasing contractor incentives to reduce costs.** PBA-like approaches may lead to reduced prices when combined with competition, the use of cost as an independent variable (CAIV), and mechanisms for allowing the contractor to share in savings. However, PBA itself may be the least important of these measures in reducing costs. PBA does not produce such measures automatically, because the military sector does not have the same competitive market forces that the commercial sector has. Moreover, contractors do not necessarily need PBA to implement these cost-saving measures and incentives (see pp. 107–124 and 128–130).

## Lessons Learned

This study suggests several lessons about the usefulness of PBA in MDAPs:

1. **Most major PBA-like DoD contracts for complex military-unique noncommercial items do (and should) require some contractor cost data.** This is particularly true of items procured in a sole-source environment. Indeed, many commercial firms find it useful to examine cost data from their contractors and subcontractors to ensure that prices are appropriate and to encourage cost-saving measures. The main difficulty in the military sector comes from the need to collect and report certified cost data according to TINA requirements. There is a wide range of options for providing contractor cost data to the government short of full CBA (which implies the use of TINA certified cost or pricing data). Many of these options appear to impose little burden on the con-

tractor and may lead to many of the claimed benefits of PBA (see pp. 135–138).

**2. PBA can be a useful addition to the acquisition manager’s toolbox with respect to large, sole-source, military-unique programs, but it should be used selectively and judiciously.** Contracting officers and other acquisition managers must have the flexibility and authority they need to effectively implement PBA concepts without undue pressure from senior acquisition officials. Specific considerations include the following:

- TINA waivers for programs with recent certified cost or pricing data are often useful, but action is required to clarify recent legislation that may effectively prohibit further use of these waivers in this area (see pp. 88–100 and 135–141).
- Federal Acquisition Regulation Part 12 commercial determinations for large sole-source military-unique systems can be problematic even if offered commercially. DoD should consider issuing more-precise guidelines for commercial determinations in such circumstances (see pp. 114–124 and 142–144).
- DoD’s credibility and its ability to continue interacting in a constructive way with contractors on PBA-type programs require it to honor the terms of agreements negotiated in good faith that establish long-term average-unit procurement price commitments (see pp. 144–145).
- The pricing of multiple follow-on production lots in the absence of a clear option to obtain updated cost or pricing data from the contractor raises major challenges for DoD contracting officers tasked with establishing “fair and reasonable” prices (see p. 146).
- Large quantity changes not anticipated in procurement price agreements raise pricing challenges for DoD contracting officers (see pp. 147–148).
- Nonrecurring development and new production prices for significantly modified new variants of items covered by long-term pricing agreements can prove problematic (see pp. 148–149).

- Experience suggests that it is important to carefully assess and include the costs of spare parts, peripherals, and weapon system support when negotiating prices on PBA-like contracts (see p. 149).
3. **Specific characteristics may make some programs potentially appropriate candidates for PBA.** Such programs should have
    - A high level of either direct or indirect contractor competition, preferably at the program’s beginning and throughout its life cycle.
    - Clearly defined and stable system performance requirements.
    - Relatively low technological risk during development and production.
    - Relatively high commercial-component content with “real” market pricing information available.
    - Adequate cost and/or price data for similar programs or products that are available to DoD cost and price analysts (see pp. 159-160).
  4. **If PBA is more widely adopted, DoD cost estimating and contracting communities will have to become less reliant on certified contractor cost and pricing data.** They will need to develop new methodologies based on parametric analysis or other approaches, which may be less reliable or defensible in determining what is a “fair and reasonable” price for DoD procurements (see pp. 151–154).



## Abbreviations

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AAC	Air Armament Center
ACE	Acquisition Center of Excellence
AFCAA	Air Force Cost Analysis Agency
AFMC	Air Force Materiel Command
AFI	Air Force Instruction
AFPEO	Air Force Program Executive Officer
AIM	air intercept missile
AMRAAM	Advanced Medium Range Air-to-Air Missile
ASC	Aeronautical Systems Center
AUPP	average unit procurement price
AUPPC	average unit procurement price commitment
AUPPR	average unit procurement price requirement
AWACS	Airborne Warning and Control System
B&P	bid and proposal
BAFO	best and final offer
BOE	basis of estimate
BY	base year
CAS	Cost Accounting Standards
CAIG	Cost Analysis Improvement Group
CAIV	cost as an independent variable
CBA	cost-based acquisition

CCDR	Contractor Cost Data Report
CEAC	Cost and Economic Analysis Center
CLIN	contract line item number
CMI	civil-military integration
CO	contracting officer
COTS	commercial off-the-shelf
CP	cost plus
CSEL	Combat Survivor/Evader Locator
DAGR	Defense Advanced Global Positioning System Receiver
DAU	Defense Acquisition University
DCAA	Defense Contract Audit Agency
DCMA	Defense Contract Management Agency
DFAR	Defense Federal Acquisition Regulation
DoD	Department of Defense
DoDI	DOD Instruction
DSP	Defense Support Program (satellites)
ECO	engineering change order
EELV	Evolved Expendable Launch Vehicle
EMD	Engineering and Manufacturing Development
EOQ	economic order quantity
EPA	economic price adjustment
ESC	Electronic Systems Center
EV	earned value
FAR	Federal Acquisition Regulation
FARA	Federal Acquisition Reform Act
FASA	Federal Acquisition Streamlining Act
FFP	firm fixed price
FMS	foreign military sales



FP	fixed price
FPIF	fixed price incentive fee
FRP	full-rate production
FY	fiscal year
G&A	general and administrative
GAO	U.S. General Accounting Office
GD	General Dynamics
GE	General Electric
GPE	government point of entry
GPS	Global Positioning System
HAF	Hellenic Air Force
HCA	head of the contracting authority
HQ	headquarters
J&A	justification and authorization
JASSM	Joint Air-to-Surface Stand-Off Missile
JCM	Joint Cost Model
JDAM	Joint Direct Attack Munition
JET	Joint Estimating Team
JPATS	Joint Primary Aircraft Training System
JPM	Joint Price Model
JSOW	Joint Stand-Off Weapon
JSTARS	Joint Surveillance Target Attack Radar System
LANTIRN	Low Altitude Navigation and Targeting Infrared for Night (System)
LRIP	low-rate initial production
LTPA	long-term pricing agreement
M	millions
MDAP	major defense acquisition program
MLRS	Multiple Launch Rocket System

MYP	multi-year procurement
NCCA	Navy Center for Cost Analysis
NDI	nondevelopmental item
OEM	original equipment manufacturer
ORD	operational requirements document
OSD	Office of the Secretary of Defense
P&W	Pratt & Whitney
PBA	price-based acquisition
PDM	programmed depot maintenance
PNM	price negotiation memorandum
PPCC	production price commitment curves
P3I	pre-planned product improvement
R&D	research and development
RF	radio frequency
RFP	request for proposal
SAF	Secretary of the Air Force
SBIRS	space-based infrared system
SDD	System Development and Demonstration
SLAM-ER	Standoff Land Attack Missile Expanded Response
SMC	Space and Missile Systems Center
SPO	system program office
TDP	technical data package
TDS	towed decoy system
TINA	Truth in Negotiations Act
TSPR	total system performance responsibility
UCA	undefinitized contracting action
UCAV	unmanned combat aerial vehicle
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics

VIQ	variation in quantity
WBS	work breakdown structure
WCMD	wind-corrected munitions dispenser
WGS	wideband gapfiller system



# Introduction

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## Overview

This report presents the findings of a research project whose objective was to examine the use of price-based acquisition (PBA) approaches for the development and production of major Air Force defense systems, subsystems, and other military-unique articles. Since the late 1990s, many senior Department of Defense (DoD) officials have been advocating the use of PBA as a major acquisition reform tool for improving cost, schedule, and performance outcomes on major defense acquisition programs (MDAPs).<sup>1</sup> PBA has been defined as

a way to buy goods and services that does not rely primarily on a supplier providing cost data. . . . In its purest form, PBA results in a firm-fixed-price . . . contract and a fair and reasonable price is established without obtaining supplier cost data. (Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 1999b,<sup>2</sup> p. 7)

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<sup>1</sup> The use of PBA for DoD procurement of common civilian commercial items and/or commodity items from numerous commercial suppliers in the market place is widely accepted and is not of direct interest to this study.

<sup>2</sup> This report, formally titled *Report of the Price-Based Acquisition Study Group*, is referred to from here on as the “PBA Study Group Report.”

The research was carried out

- to clarify the definition of PBA in terms of how it has been understood by the acquisition community and applied in the recent past to major defense-unique weapon system acquisition programs
- to survey claimed benefits and challenges of PBA
- to identify, categorize, and assess a spectrum of PBA and PBA-like programs and approaches that DoD has implemented or is implementing
- to determine the feasibility of documenting—in a manner useful to the acquisition planning, contracting, and cost estimating communities—the savings or cost avoidances<sup>3</sup> from use of PBA for both government and contractor activities
- to document, if feasible, schedule savings, workload reductions, and other claimed benefits from use of PBA for both government and contractor activities
- to assess potential challenges arising from use of PBA
- to provide recommendations for future application of PBA based on “lessons learned” from existing programs.

We adopted a structured interview and case study approach to assess PBA. We began by systematically interviewing a large number of senior DoD and industry acquisition management officials having practical experience with PBA-like acquisition approaches. Our interviews followed a standardized written questionnaire that was provided in advance; most of them took place at the four major Air Force

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<sup>3</sup> We define these two terms in accordance with Air Force Instruction (AFI) 38-301, *Productivity Enhancing Capital Investment Program*, 15 February 2002, Attachment 1, and, in the process, substitute the term *savings* for *hard savings* and the term *cost avoidances* for *cost avoidance savings*. In short (full definitions are given as part of the discussion in Chapter Two), we define *savings* as “[b]enefits you can precisely measure, quantify, and place under management control at the time the benefits occur.” And we define *cost avoidances* as “[b]enefits from actions that remove the need for an increase in manpower or costs and would be necessary if present management practices continued.”

product centers<sup>4</sup> and focused on acquisition practitioners primarily involved in program management, cost estimating, and contracting.<sup>5</sup> Other Air Force, Office of the Secretary of Defense (OSD), Navy, and Army experts familiar with PBA were also interviewed. In addition, we conducted wide-ranging interviews with industry officials responsible for program management, cost or pricing analysis, contracts, and business development. These individuals represent many of the prime contractors that have experience with PBA-like programs. The organizational affiliations of the experts interviewed are provided in greater detail later in this chapter.

We also selected and reviewed more than 30 specific acquisition programs whose varying sizes and complexity represent the full spectrum of current PBA-related approaches. We used interviews with government and industry program officials, government and industry documents and studies, and open published literature. The case studies represent a reasonably wide variety of platforms, major subsystems, missiles, guided munitions, and other equipment; they were taken from and in part were originally identified by the four principal Air Force product centers. Several joint service programs and two Army programs were also examined. A list of the case studies is presented later in this chapter.

## **Background: PBA's Growing Importance for the Air Force**

DoD procurement of high-value sole-source military-unique systems has traditionally been conducted using cost-based acquisition (CBA) approaches, in which DoD contracting officers (COs) rely on extensive certified cost or pricing data provided by the contractor to estab-

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<sup>4</sup> Aeronautical Systems Center (ASC), Wright Patterson Air Force Base, Ohio; Air Armament Center (AAC), Eglin Air Force Base, Florida; Electronic Systems Center (ESC), Hanscom Air Force Base, Massachusetts; and Space and Missile Systems Center (SMC), Los Angeles Air Force Base, California.

<sup>5</sup> In the Air Force, cost analysts are part of the comptroller organization, and price analysts are part of the contracting organization. Both groups would normally assist the contracting officer, who is responsible for making the final determination and certification.

lish a fair and reasonable price. Advocates of acquisition reform point to three principal criticisms of this traditional, CBA approach.

First, CBA imposes costly and time-consuming regulatory burdens on both DoD and contractors in that they must collect, certify, and assess cost or pricing data in order to determine whether contractor prices are fair and reasonable.<sup>6</sup> This regulatory burden, it is claimed, leads to a cost premium that unnecessarily increases the price of DoD procurements by requiring that both the government and the contractors maintain unduly large and expensive support infrastructures for cost collection, reporting, analysis, auditing, and contract management. In addition, many PBA advocates would assert that, over time, a culture and procedures have developed in DoD that require far more cost data than are truly necessary, thereby maintaining an environment that adds workload not only for contractors (which must develop the cost data), but also for DoD analysts (who must evaluate everything in the contractor proposal, regardless of its potential impact on final price determination).

The second major criticism of CBA raised by reformers is that the vast majority of civilian commercial firms that do not specialize in military procurement are deterred from competing for DoD contracts because of the cost collection and disclosure burdens, the DoD-unique accounting systems and other oversight mechanisms that are imposed on defense contractors, and the potential legal liabilities raised by legislation such as the Truth in Negotiations Act (TINA).<sup>7</sup>

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<sup>6</sup> The Truth in Negotiations Act (TINA), passed by Congress in 1962, is the key piece of legislation establishing the framework for contractor provision of certified cost or pricing data in large sole-source military-unique procurements. According to the U.S. General Accounting Office (2002), the implementation of TINA can be “lengthy, and the documentation requirements for both sides can be extensive.” Contractors must certify that all costs in proposals are accurate, complete, and current. The government has extensive auditing rights under TINA, and if it later concludes that, for whatever reason, a contractor’s certified cost or pricing data were not accurate, complete, and current, the contractor may be liable for fines and other civil and criminal penalties.

<sup>7</sup> CBA may require contractors to track and allocate costs at a level of detail and in a format that often differ significantly from standard commercial best practices. This requirement often forces defense contractors to establish a government-unique cost accounting and contracting infrastructure driven by the federal Cost Accounting Standards (CAS) to track costs in government format, determine their allowability, and allocate them to the designated



Moreover, the reformers contend, many civilian commercial firms strongly object to DoD's ability to fix and audit contractor profit margins and, indeed, consider their detailed cost and profit data to be proprietary and competition sensitive. This situation, it is claimed, not only denies DoD access to cutting-edge technologies and processes from the civilian commercial sector, but also reduces competition.

The third criticism is that CBA provides few incentives to defense contractors to reduce the prices DoD pays for goods and services. This criticism is based on the fact that because contractor profits under CBA are mainly determined as a percentage of contract costs, a contractor desiring to improve its profits has an impetus to focus on proving why a system costs so much rather than on ways to reduce costs.<sup>8</sup>

By the late 1980s, as procurement and research and development (R&D) budgets continued to decline from the peak years of the Reagan administration, interest grew in reforming the defense acquisition system to make it more cost-effective. The end of the Cold War and the expectation of much steeper cuts in the defense budget then accelerated these trends. Early in 1994, then Secretary of Defense William Perry launched a major new series of acquisition reform initiatives aimed at achieving a defense acquisition system that would be more flexible, less costly, smaller, and more agile (Perry, 1994). He explicitly pinpointed three items as being among the most important cost drivers behind the DoD "regulatory cost premium" paid for defense procurements: the government collection of certified cost or pricing data as required by TINA, the imposition of burdensome government-unique cost accounting and reporting systems, and government cost oversight and audits.<sup>9</sup>

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accounts and categories. Reformers argue that this adds unnecessary costs to DoD acquisitions and inhibits civilian commercial contractors that lack the government-unique accounting infrastructure from seeking government contracts.

<sup>8</sup> Of course, there is a theoretical bound on this, since a system could be cancelled if costs were to exceed projections by too much.

<sup>9</sup> Some observers estimated that the DoD regulatory cost premium added as much as 50 percent to the cost of DoD defense procurements. Heavy criticism was directed at the TINA

Other central aims of these reform efforts were to promote greater integration of the civil and military industrial bases (civil-military integration [CMI]) and to transform DoD acquisition into a more commercial-like process. DoD reformers advocated greater CMI as a way to increase competition and gain access to cutting-edge commercially developed technologies and processes. Not surprisingly, reformers also often viewed CBA—with its requirement for the collection of massive quantities of sensitive contractor cost data and its imposition on contractors of unwieldy and complex government-unique cost accounting, reporting, and audit systems—as a major impediment to greater CMI. The push for greater CMI thus became an increasingly important rationale for expanding the use of PBA for military-unique defense acquisitions, so that market forces or factors other than the collection and evaluation of detailed certified contractor cost data would determine the price of defense goods and services. Another motivation for pursuing greater use of PBA, one that was of growing importance for senior DoD leadership, was to facilitate the significant planned downsizing of the acquisition workforce by reducing the government cost analysis, auditing, and contract management workload.

Congress responded to these trends by passing the Federal Acquisition Streamlining Act of 1994 (FASA) and the Federal Acquisition Reform Act of 1996 (FARA), both of which were aimed at simplifying acquisition procedures and increasing DoD access to civilian commercial technologies and firms. DoD and the services undertook numerous other initiatives to promote various aspects of acquisition reform during this period.<sup>10</sup>

The use of PBA for DoD procurement of civilian commercial, dual-use, relatively low technology items and/or bulk commodity items became widely accepted in the 1990s. Yet one of the most far-

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requirements for certified cost or pricing data, as well as at government-imposed accounting and reporting standards and systems such as the CAS, Cost/Schedule Control System Criteria (C/SCSC), and Material Management Accounting System (MMAS). For further discussion of this period's estimates of the DoD regulatory cost premium, see Lorell and Graser, 2001.

<sup>10</sup> For a more detailed discussion, see Lorell et al., 2000; and Lorell and Graser, 2001.

reaching effects of FASA and FARA was a significant broadening of the definition of what constituted a “commercial” item, as defined in Federal Acquisition Regulation (FAR) Part 2.101,<sup>11</sup> which permitted senior DoD acquisition officials to apply PBA in procuring major military platforms (such as the C-130J tactical transport aircraft), an application that would have been prohibited under the old regulations.<sup>12</sup>

In response to the final report of the DoD Task Force on Defense Reform (Cohen, 1997; delivered in November 1997) and the report of the Defense Science Board Sub-Task Force on Acquisition Workforce (Cohen, 1998), Section 912(c) of the National Defense Authorization Act for Fiscal Year (FY) 1998 directed the Secretary of Defense to submit to Congress an implementation plan to streamline the acquisition organizations, workforce, and infrastructure. Then Secretary of Defense William Cohen responded to Congress on 1 April 1998 with a series of new initiatives intended to

achieve additional fundamental reform in how the Department of Defense conducts business by implementing a real revolution in business affairs. . . . [T]he Department and its workforce continue to labor under an organization, infrastructure, and legal and regulatory morass. . . . We continue to spend too much on infrastructure at the expense of equipping our forces. . . . All of this must change. (Cohen, 1998, attached cover letter)

Cohen’s initiatives were organized into five categories. Category Five, called Future Focus Areas, contained two major reforms, one of which was “Price Based Approach to Acquisition.” The report to Congress promised a “Department-wide effort” to promote the implementation of PBA.

Broader application of PBA to military-unique defense acquisition programs remained contentious, however, because of the many

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<sup>11</sup> Unless noted otherwise, all references to portions of the *Federal Acquisition Regulation* (FAR) are to the September 2001 edition, which consolidates all Federal Acquisition Circulars (FACs) through 97–27.

<sup>12</sup> This topic is discussed at greater length in Chapter Five.

significant structural differences (discussed in more detail below) between the commercial and defense-unique marketplaces. In accordance with the Secretary's instructions, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD[AT&L]), Jacques S. Gansler, commissioned a DoD study group in October 1998 to analyze implementation of PBA on a much broader, DoD-wide basis. A large number of experts participated in the study group, including senior representatives from the OSD and all three services, as well as experts from industry. At the end of 1999, this group published the PBA Study Group Report, which included numerous detailed implementation recommendations.

Many of those implementation recommendations were highly controversial, some calling for radical changes to the way the services conduct acquisition of major new weapon systems. Indeed, the study group's proceedings proved so contentious that the report was delivered nine months late, and consensus among team members on the ultimate findings proved impossible. A cover page of the report prominently noted that "not all conclusions or recommendations are supported by all team members," and that "many of the report recommendations are not currently permissible within today's regulatory and statutory environment."

Nonetheless, many in the senior DoD acquisition leadership continued to strongly support the broader DoD-wide application of PBA. This position was buttressed by the findings of the Defense Science Board Task Force on Acquisition Reform, which concluded in the summer of 1999 that the "most compelling (acquisition reform) initiative currently underway is Price-Based Acquisition"<sup>13</sup> (Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, 1999a, p. vi). Thus, despite the lack of consensus on the PBA study group findings, Under Secretary of Defense Gansler forged ahead with efforts to implement greater use of PBA in DoD acquisitions.

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<sup>13</sup> The overall Defense Science Board Task Force, which was first convened in late 1997, assessed the implementation and progress of a wide variety of acquisition reform measures.

Late in 2000, Gansler circulated a memorandum for the secretaries of the military departments that supported the PBA Study Group Report and strongly endorsed the more extensive use of PBA throughout DoD (Gansler, 2000). Following the November 2000 presidential election, when the new senior DoD leadership appointed by President Bush emphasized the “transformation” of the U.S. military, the focus on PBA grew stronger as PBA took on the role of a key acquisition tool supporting transformation. For example, in a speech delivered in April 2002, E. C. “Pete” Aldridge, Jr., the new USD(AT&L), embraced PBA as one of the most important “basic tenets of our acquisition principles” necessary for understanding and implementing DoD’s vision of transformation. Aldridge stressed the reduced costs and regulation that would accompany greater use of PBA, as well as the greater numbers of smaller civilian commercial firms that would be willing to do business with DoD:

[Cost-based acquisition] required that the DOD and industry engage in a lengthy, expensive, and often futile pantomime by which the cost to the government of a product was evaluated, estimated, then negotiated, often at the expense of the industry. So burdensome have been the requirements of cost-based pricing, that often only the largest defense contractors—those with large legal and accounting offices—choose to compete. “Price-based acquisition” calls upon the government to pay a fair market price for a product, whenever possible. By so doing, smaller companies will be encouraged to compete for defense work, while the initial costs of programs will be reduced. (Aldridge, 2002)

Shortly thereafter, the new Secretary of the Air Force (SAF), James G. Roche, underlined the long-term commitment to “top to bottom reform of the way the Service develops and buys weapon systems” with the establishment of a new Acquisition Center of Excellence (ACE) (announced in December of 2001) and the promulgation of six new “Lightning Bolt” policy initiatives (developed by Air Force acquisition leaders) embodying the new reform principles of the Air Force Agile Acquisition reform effort (Air Force News Service, 2001). While not specifically mentioning PBA, the six Lightning

Bolts focused on innovation in acquisition and further streamlining of the complex acquisition process. Terry Little, the first director of the new ACE, emphasized early on that the Air Force would be moving even more decisively away from cost-plus reimbursable contracts to PBA in order to save on costs (Book, 2002).

## **PBA Benefits**

As this overview indicates, senior DoD and service acquisition officials have persisted in advocating broader use of PBA since at least the late 1990s, in spite of ongoing controversy regarding its applicability to defense markets, especially for military-unique systems and subsystems. The reason is simple: PBA has continued to be viewed as a potentially effective acquisition tool for reducing weapon system costs and schedules and enhancing quality. Given the existence of widespread skepticism and resistance to acquisition reform, however, many in the acquisition community have continued to want to know the exact scale of these claimed benefits and the precise way in which they would arise from the use of PBA.

Any thorough assessment of PBA requires as systematic and clear an understanding as possible of what the claimed benefits of PBA are, how they arise in theory from its application, and what challenges and risks are posed in theory by its use. Based on our survey of government and industry studies,<sup>14</sup> as well as extensive interviews with government and industry officials, we have identified at least three broad categories of acquisition benefits claimed for PBA:<sup>15</sup>

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<sup>14</sup> By far the most important and the most comprehensive documented assessment of PBA conducted under DoD auspices is the 1999 PBA Study Group Report. The study generated the basic definition of PBA that is used in virtually all DoD and DoD-supported publications on the subject. Other influential studies include Litton/TASC, 1999; Office of the Secretary of Defense for Acquisition Reform, 1999; Arthur Andersen LLP, 1999; Rohe, 2002; and Pietras, 2002.

<sup>15</sup> Another category that could be assumed is reduced workload, which presumably would be manifested in reduced cost and schedule. This topic is addressed in more depth in Chapters Two and Three.

- Reduced cost
- Shorter schedules
- Higher quality.

### **Reduced Cost**

“Cheaper, faster, better” has long been the mantra of acquisition reform, and PBA is no exception. But the PBA benefit most often emphasized is reduced cost. PBA is claimed to reduce the prices the government pays for goods and services through mechanisms that can be broadly categorized as reduced overhead, share in savings, and enhanced CMI:

- **Reduced overhead**
  - Reduced DoD overhead costs
    - Cost and price analysis
    - Proposal evaluation
    - Audits
    - Cost data collection
    - Contract management and oversight
  - Reduced contractor overhead costs
    - Proposal preparation
    - Cost collection and reporting
    - Cost of support to DoD contract management and oversight
- **Share in savings**
  - Commercial-like contractor incentives to reduce costs in order to increase profit
- **Enhanced civil-military integration (CMI)**
  - Greater competition by attracting more civil/commercial competitors
  - Greater access to lower-cost nondevelopmental items (NDIs) and civil/commercial technologies.

PBA advocates claim that the use of PBA reduces costs by lowering overhead costs for both the government and industry. As mentioned at the beginning of this chapter, these savings come from

eliminating the “cost premium” that doing business with DoD imposes on industry in the form of myriad government-unique cost accounting, cost reporting, certification, and analysis requirements mandated by federal regulations and statutes when conducting CBA sole-source procurements. At the same time, it is claimed, PBA saves the government money by eliminating the need for a large infrastructure of government cost and price analysts and other experts to evaluate proposals, assess cost data, conduct audits, and so forth.<sup>16</sup>

Three other PBA factors, however, are often advanced as far more important than overhead savings in reducing prices paid by DoD. These are all related to the theoretical benefits of CMI, or greater participation of civilian/commercial contractors in DoD business opportunities, which PBA is claimed to promote. CBA advocates claim that the government-unique regulatory environment—particularly TINA and other government cost reporting requirements, government-unique accounting and tracking systems, and other, related government regulations—inhibits the participation of civilian commercial firms in DoD competitions. Civilian commercial firms (1) do not want to invest the money necessary to install government-compliant accounting and reporting systems (since government contracts would still remain a small percentage of their overall business) and (2) do not want to reveal their costs and profits (which they consider proprietary and competition sensitive) to the government. If PBA were practiced on a larger scale, it is argued, many more civilian commercial firms would compete for DoD contracts, thus lowering costs to DoD through increased competition. A direct corollary to this argument is that if more civilian commercial firms competed for DoD contracts, the government would gain greater access to less-expensive and higher-quality commercially developed items and technologies.<sup>17</sup>

Perhaps most important for PBA advocates is the claim that PBA will motivate contractors to cut their costs in order to “share in

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<sup>16</sup> These factors are discussed and assessed in much more detail in the next two chapters.

<sup>17</sup> For a more thorough discussion of CMI, see Lorell et al., 2000.



savings.” Under CBA, company profits are essentially earned as a percentage of costs incurred. Therefore, the PBA advocates argue, with the exception of budget pressures, CBA establishes a perverse incentive for contractors: To maximize profit, avoid reducing costs. In the commercial world and with PBA, the contractor sells an item for a price determined by the market, not by the individual seller or buyer. The more the contractor drives its costs below the market price, the higher its profit will be. Therefore, in theory, a PBA commercial-like approach strongly incentivizes a contractor to continue reducing costs below the established price, whether that price is established by the market or by a contract.

Advocates of PBA argue that mechanisms can be developed that permit the government and the contractor to “share in savings,” so that the government will benefit from the contractor’s incentives under a fixed-price PBA contract to reduce costs. At the very worst, it is argued, even if the contractor retains all the cost savings for itself as pure profit (and does not “share in savings” with the government), it will still greatly increase its cost efficiency over time, thus permitting it to offer later quantities of the same or similar items to the government at much lower prices than it would have been able to otherwise.

### **Shorter Schedules/Higher Quality**

In addition to their main claimed benefit—lower procurement cost to the government—advocates of PBA contend that it will shorten schedules and enhance system quality. In theory, the shortened schedule arises in part from elimination of the burdensome cost reporting and government cost and data analysis requirements typical of proposal preparation and evaluation under CBA. The magnitude of workload, schedule, and time savings theoretically obtainable using a PBA approach is discussed in Chapter Two in greater detail. Another claimed source of schedule reductions arises from the claimed greater efficiencies of using a more commercial-like approach, as well as the ability to exploit existing commercial technologies and NDIs. In a like manner, PBA supporters claim that the increased access to commercial technologies and processes, as well as

the introduction of more competitors, will enhance the quality and performance of military-unique defense products.

## PBA Challenges

Opposed to this impressive array of PBA's claimed theoretical benefits is a significant list of challenges and potential pitfalls that have been advanced by critics:

- Inadequate market indicators for military-unique products, particularly because there is no real competition
- A shifting of workload from the contractor in proposal preparation to government cost and price analysts to determine market-based fair and reasonable prices in the absence of historical cost data
- Higher risk of contractor "buy-ins"
- Increased risk of "excessive profits" or "price gouging"
- Requirement for major statutory changes for full implementation.

The most compelling critique is that the use of PBA in defense acquisition of truly noncommercial items, particularly sole-source defense-unique items, assumes a market structure and market dynamics that do not exist in the defense marketplace. Recall that the basic definition of PBA, which comes from the PBA Study Group Report and is used in virtually all DoD and DoD-supported publications on the subject, states that "[p]rice-based acquisition is a way for DoD to buy goods and services that does not rely primarily on a supplier providing cost data."<sup>18</sup>

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<sup>18</sup> Most DoD-related discussions of PBA use this definition or a similar one. For example, a Department of the Navy definition of PBA states: "In its purest form, PBA results in a firm-fixed price . . . contract and a fair and reasonable price is established without obtaining supplier cost data" (as quoted in Rohe, 2002). For examples of other, similar definitions, see Pietras, 2002; and Arthur Andersen LLP, 1999.

As another DoD-supported study (Arthur Andersen LLP, 1999) points out, a “price-based environment is one where market forces and business initiatives determine the price of a product or service,” not the actual costs incurred by the supplier to develop and produce the product or service. Thus “pure” PBA, which implies a fixed-price contract and limited insight into the supplier’s actual costs, is a radical departure from the traditional CBA typically used for sole-source defense-unique acquisitions.

### **Commercial Versus Defense Markets**

In the commercial world, buyers count on market factors and especially on competition among numerous potential suppliers to ensure that they receive a fair and reasonable price. These circumstances often do not hold in the military market. While most civilian commercial markets are characterized by many buyers and sellers, the market for major military-unique defense items is often closer to a monopsony/monopoly situation. The widespread competition so important in determining price in the commercial world may not be fully functional in the marketplace for defense-unique weapon systems. To complicate matters, the U.S. defense industry consolidated dramatically throughout the 1990s, causing the likelihood of competition to decline and in some cases disappear for various types of major weapon systems and subsystems.<sup>19</sup> In addition, compared with commercial items, military-unique systems tend to be much more complex and to entail much greater technological risk to develop. All these factors, according to critics of PBA, greatly complicate the government’s ability to determine a fair and reasonable price in the absence of supplier-provided cost data, particularly in the case of sole-source military-unique items.

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<sup>19</sup> As just one among many possible examples, Raytheon, following its acquisition of Hughes Electronics’ defense business and Texas Instruments’ Defense Systems and Electronics Group in 1997, became the only credible supplier of both medium- and short-range air-to-air missiles in the United States.

### **Contractor “Buy-Ins” and “Price Gouging”**

According to PBA’s critics, the different structural characteristics that distinguish many sectors of the defense market from typical commercial markets make it likely that the use of PBA will lead to more frequent contractor “buy-ins”—i.e., situations in which contractors purposely bid unrealistically low in order to win contracts, whether they are competitive or sole source. In acquisition programs for unique new military-specific items, it is argued, the ability of COs to determine price reasonableness will be limited by the lack of contractor-supplied cost and supporting data. Contractors thus may bid unreasonably low to win competitions or to stimulate DoD demand. And, critics contend, even with a firm-fixed-price (FFP) contract, a contractor that has won based on an unrealistically low bid may prove unable to deliver the capability at the contracted price, thus denying the government a needed capability or forcing a later increase in price. This is a particularly important concern when weapon systems offering critical capabilities are involved and development times are lengthy.

PBA critics also raise concerns associated with the effective monopoly situation enjoyed by many defense contractors in various market segments. Their fear is that unless DoD has access to actual costs incurred by contractors, it will put itself at risk for claims of “price gouging” or “excessive profits” or for bad stewardship of public funds. PBA advocates counter that contractor profit levels are relevant only in that they help incentivize contractors to reduce costs and improve process technologies. They argue that the user should determine a value for the capability it needs that is independent of contractor cost, and then establish challenging price objectives and thresholds for the contractor to meet. If the contractor meets the price objectives with a quality product, the size of its profit is of no concern to the buyer. In fact, PBA proponents see a larger than average profit for the contractor in this case as a “win-win” situation. The parallel here is the typical consumer who is pleased with the product purchased and price paid and does not care how much profit the manufacturer makes. Yet the concerns of critics cannot be so easily dismissed. Acquisition officials supervise the expenditure of vast sums

of public monies and exercise a serious fiduciary responsibility. Even the *appearance* of bad stewardship could at the very least have serious political or bureaucratic repercussions.

### **Statutory and Cultural Impediments**

Finally, PBA critics often note that the full implementation of PBA requires statutory changes and real cultural change in the acquisition workforce. This was a major sticking point in the PBA study group's attempt to reach consensus on its findings. The study group divided its policy recommendations into three implementation groups: those requiring internal procedural changes, those requiring regulatory changes,<sup>20</sup> and those requiring statutory changes. Out of the study group's 31 policy recommendations, nearly two-thirds required regulatory changes, and almost one-third required statutory changes.<sup>21</sup>

Perhaps the single most important cause of the 1999 DoD study group's failure to reach consensus on findings and policy recommendations was the dearth of practical experience and hard evidence relating to the application of PBA to military-unique acquisition programs. Most assertions about PBA's benefits and pitfalls were based on abstract theory, expert opinion, analogies to similar commercial programs, or anecdotal evidence, and little hard evidence had been systematically collected on documented cost savings and other claimed benefits attributable to PBA or on risks and problems that could arise from adopting a PBA approach. Programs using forms of PBA were under way, but the hard data needed were not available—either because of methodological issues or because most acquisition-reform pilot programs were in early developmental stages.

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<sup>20</sup> That is, those requiring changes to the DoD 5000 Series detailing the defense acquisition process, to the FAR, and/or to the Defense Federal Acquisition Regulation (DFAR).

<sup>21</sup> Included in this last group were such issues as source selection strategies, TINA, financing, wage determination, cancellation charges, contract types, contract modification, and pricing methods.

## Research Approach and Case Studies

### Characterizing and Categorizing PBA-Like Cases

Given the lack of evidence just described, one of our main objectives was to systematically assess—in a manner useful for DoD cost analysis, program management, and contracting communities—and quantify, where possible, the cost, schedule, and workload savings alleged to accrue from the use of PBA in major military-unique defense acquisition programs. In addition, we sought to systematically develop lessons learned about the appropriate application of PBA.

To meet these objectives and to transcend the limitations of theory and speculation, we concluded that we would have to survey as many actual PBA-like programs as possible, as well as the acquisition officials involved in them. This raised the methodological question of what program characteristics should be used to guide our selection of case studies. This question is not trivial, given the fact that DoD's 1999 PBA study group ultimately settled on a very flexible, broad, and inclusive characterization of PBA attributes applicable to defense acquisition programs.

The PBA study group fully recognized the seriousness of the theoretical, structural, and practical statutory and regulatory challenges posed by PBA (as discussed above), especially with respect to programs involving military-unique major weapon systems. It is not surprising, then, that the group concluded that "PBA is not appropriate in every circumstance." Yet rather than advising against the use of PBA in many challenging circumstances, the study group recommended that numerous policy initiatives and statutory changes aimed at reducing the risks of using PBA for major military-unique defense acquisitions be implemented. It also noted that "much can be done now," by changing DoD internal procedures, even before the slow process of changing regulatory and statutory policies can be carried out. These procedural measures were intended to enhance competition, control price, and reduce technological risk, so that PBA could be used more effectively. They included such initiatives as increased emphasis on "dissimilar competition," "spiral development" acquisition strategies, "rolling" downselects, use of price requirement objec-

tives in Operational Requirements Documents (ORDs), much expanded use of market price research and analysis tools, and use of parametric and other types of indirect cost estimating tools.

These recommendations are directly related to one of the study group's key findings: that the debate should not be presented in stark terms of "pure PBA" versus "pure CBA." Rather, "[t]here is a continuum between PBA and CBA, with many acquisitions having characteristics of both." Thus, the study group came to the conclusion that there are many important ways to use elements of PBA to design programs lying somewhere in the gray area between the extremes of pure PBA and pure CBA. Indeed, the PBA Study Group Report presents a whole range of the continuum, grouped into three large categories labeled "acquisition strategy," "enablers," and "business case development." These include such factors as degree of competition (from none to adequate), contract type (from cost to firm fixed price), and use of cost data (from certified cost or pricing data to no cost data). In short, the study group maintained that there are numerous factors of importance to PBA, and that each exists on a continuum from pure PBA to pure CBA. "Between these two ends of the continuum," it notes, "an approach that mixes aspects of CBA and PBA can be used, dependent on particular circumstances of the acquisition." In the end, the PBA study group concluded that

[t]he label placed on the acquisition is not what is important in the long run. What is important is that, in the larger scheme of all acquisitions, a significant move towards PBA is made along all individual continuums (PBA Study Group Report, p. 9).

These issues that the study group raised greatly influenced our selection of case studies. To ensure we identified a sufficiently rich array of relevant case studies for examination and analysis, we decided to accept the study group's approach. We thus adopted a very wide band of potential programs along the spectrum from pure CBA to pure PBA in order to bound our population of potential candidate case studies and to develop a PBA case study taxonomy to differentiate among the major types and subtypes.

Again, as determined by the study group and repeated by virtually all DoD studies on the topic, the essence of PBA is the acquisition of goods and services in a manner “that does not rely primarily on a supplier providing cost data.” The FARs, specifically FAR Part 15.403-1, carefully lay out the conditions under which cost or pricing data shall not be obtained for major acquisitions (where *major* is defined as exceeding a threshold of \$550,000). We decided to use this particular regulation as the baseline determinant for understanding what degree of PBA has been possible under the current regulatory environment, and to help us in selecting the case studies. This approach seemed reasonable to us, since all major military-unique defense acquisitions with PBA-like elements must conform to the FAR.

### Three PBA Categories

In actual historical practice, there are only a few circumstances in which the statutory or regulatory requirements for submission of certified cost data do not apply. In our determination, the three major categories of interest for PBA-like case studies are those that have received exceptions to certified cost or pricing data requirements for one of the following reasons:

- A waiver of FAR Part 15, based on adequate cost data
- Adequate price competition
- Commercial item determination.

**Waiver of FAR Part 15.** The granting of TINA waivers exempting the requirement for certified cost or pricing data has been and remains controversial. Historically, waivers were supposed to be granted only in “exceptional cases,” when “the price can be determined to be fair and reasonable without submission of cost or pricing data.” The regulation provides only one example—a case in which the contractor has provided cost or pricing data on previous production buys—and this has normally been the only circumstance for which a waiver was permissible (see FAR Part 15.403-1(c)(4)). However, with the passage of the FY 2003 DoD Authorization Act in



early 2003, the waiver provision was tightened up considerably, possibly eliminating even this limited application. (These issues are discussed in greater detail in Chapter Five.) We thus decided to characterize PBA cases based on waivers as the most conservative use of PBA-like mechanisms and the closest on the continuum to traditional, CBA contracts.

**Adequate Price Competition.** FAR Parts 15.403-1(c)(1) and 15.403-3(b) lay down the conditions for determining adequate price competition and note that generally no additional information is necessary to determine price reasonableness. In our review of case studies in this category, we determined that despite this regulation, the government has often collected substantial quantities of cost or pricing data, particularly in sole-source follow-on production contracts, in order to ensure price reasonableness. However, we also found cases, particularly involving acquisition-reform pilot programs, in which only small quantities of cost or pricing data or none at all were collected after development, even though many follow-on production lots were later acquired on a sole-source basis. All these cases, of course, had to pass a price reasonableness assessment. In short, the cases in the category of competition exception were found to cover a very wide range on the continuum from pure CBA to pure PBA.

**Commercial Item Determination.** Perhaps the most radical use of PBA can be found in the third category—i.e., cases in which commercial determinations have been made. The definition of what constitutes a commercial item, as now laid out in FAR Part 2.101, has undergone significant and dramatic changes over the past decade, particularly as the result of FASA and FARA. These changes have had a major impact on the use and application of PBA. We found that in certain circumstances, these changes have permitted DoD leadership to designate sole-source military-unique procurements as commercial items, thus exempting them from cost or pricing requirements. They still, however, have had to be assessed as to price reasonableness.<sup>22</sup> These changes are discussed in more detail in Chapter Five.

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<sup>22</sup> FAR Part 12 lays out the policies and procedures for acquiring commercial items.

We thus found that virtually all existing PBA-like major military-unique defense acquisition programs that had entered or were about to enter into production fit into one of our three categories. In addition, we determined that both between and within these three major categories, the spectrum of differences in the use of cost or pricing data, as well as numerous other acquisition indicators related to PBA, was significant. This diversity required that we develop a taxonomy of PBA-like case studies based on these categories as a way to help clarify our understanding of how PBA can be and is implemented on major DoD acquisition programs. This taxonomy is presented and discussed in Chapter Four.

### **DoD and Industry Organizations Interviewed**

To solicit expert opinion on the theory and application of PBA and to seek advice on which programs to examine, we conducted systematic interviews with people at a variety of DoD organizations (see summary in Table 1.1). We interviewed senior officials in the Office of the Deputy Under Secretary of Defense for Acquisition Reform who had held leadership roles on the 1999 PBA study group,<sup>23</sup> as well as acquisition and contracting policy experts at the Defense Acquisition University. To obtain specific Air Force perspectives, we interviewed the Air Force Program Executive Officer (AFPEO) for Weapons Programs and officials at the Office of Air Force Contracting and the Acquisition Center of Excellence within the Office of the Assistant Secretary of the Air Force for Acquisition. To secure the views of cost and price analysts, we interviewed experts at the Air Force Cost Analysis Agency, the Navy Center for Cost Analysis,<sup>24</sup> the Army Cost

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<sup>23</sup> In 2002, OSD eliminated this office and folded many of its functions into the Office of Defense Procurement and Acquisition Policy within the Office of the Deputy Under Secretary of Defense for Acquisition and Technology.

<sup>24</sup> In early FY 2003, the Navy disbanded the NCCA and transferred its functions and remaining people to the Assistant Secretary of the Navy (Financial Management and Comptroller).

**Table 1.1**  
**Government Experts Interviewed: Acquisition Policy and Reform, Contract Policy, and Cost Analysis**

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Office of the Deputy Under Secretary of Defense for Acquisition Reform, USD(AT&L)
Air Force Program Executive Officer for Weapons Programs, AFPEO/WP
Air Force Contracting (SAF/AQC)
Acquisition Center of Excellence (SAF/ACE)
Contract Pricing Office, Headquarters Air Force Material Command (AFMC/PK)
Air Force Cost Analysis Agency (AFCAA)
Navy Center for Cost Analysis (NCCA)
Army Cost and Economic Analysis Center (CEAC)
OSD Cost Analysis Improvement Group (CAIG)

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and Economic Analysis Center, the OSD Cost Analysis Improvement Group, and the Contract Pricing Office at Headquarters (HQ) Air Force Material Command.

We also needed detailed information on Air Force experience with implementation of PBA and suggestions for specific case studies. To fill this need, we interviewed numerous program management, contracting, and cost or pricing experts at all four major Air Force product centers that manage the development and procurement of major military-unique defense acquisition programs.<sup>25</sup> Table 1.2 lists the offices we visited.

We also conducted extensive interviews with contractor officials specializing in program and business management, contracting, and pricing at several companies. Table 1.3 lists the contractor locations we visited and the programs that were specifically discussed.

### **Selected Case Studies and Research Questions**

Based on a review of the relevant literature, our extensive interviews with a wide range of government and industry experts (see discussion

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<sup>25</sup> These are HQ AFMC and Aeronautical Systems Center (ASC) at Wright-Patterson Air Force Base, Ohio; Air Armament Center (AAC) at Eglin Air Force Base, Florida; Electronic Systems Center (ESC) at Hanscom Air Force Base, Massachusetts; and Space and Missile Systems Center (SMC) at Los Angeles Air Force Base, California.

**Table 1.2**  
**Government Experts Interviewed: Air Force Product Centers and System Program Offices**

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Aeronautical Systems Center (ASC) <ul style="list-style-type: none"><li>-Contracts and Pricing Office (ASC/PKF)</li><li>-Mobility SPO [System Program Office] (ASC/GR)</li><li>-F-16 SPO (ASC/YP)</li><li>-C-17 SPO (ASC/YC)</li><li>-Training Systems SPO (ASC/YW)</li></ul>
Air Armament Center (AAC) <ul style="list-style-type: none"><li>-Cost Analysis Directorate (AAC/FMC)</li><li>-Acquisition Center of Excellence (AAC/ACE)</li><li>-Joint Air-to-Surface Stand-off Missile (JASSM) SPO (AAC/YV)</li><li>-Joint Direct Attack Munition (JDAM) SPO (AAC/YU)</li><li>-Counter Air Joint SPO (AAC/YA)</li><li>-Area Attack SPO (AAC/YH)</li></ul>
Electronic Systems Center (ESC) <ul style="list-style-type: none"><li>-Acquisition Center of Excellence (ESC/AE)</li><li>-Contracting Directorate (ESC/PK)</li><li>-Cost Analysis Directorate (ESC/FMC)</li><li>-Global Air Traffic Operations/Mobility Command &amp; Control SPO (ESC/GA)</li></ul>
Space and Missile Systems Center (SMC) <ul style="list-style-type: none"><li>-Acquisition Cost Division (SMC/FMPC)</li><li>-Directorate of Contracting (SMC/PK)</li><li>-Evolved Expendable Launch Vehicle (EELV) SPO (SMC/MV)</li><li>-NAVSTAR Global Positioning System Joint SPO (SMC/GP) CSEL</li><li>-Space Based Infrared System (SBIRS) SPO (SMC/IS) DSP</li></ul>

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**Table 1.3**  
**Experts Interviewed: Contractors and Programs**

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Lockheed Martin Integrated Systems, Orlando, FL <ul style="list-style-type: none"><li>-JASSM</li><li>-Wind Corrected Munitions Dispenser (WCMD)</li></ul>
Raytheon Missile Systems, Tucson, AZ <ul style="list-style-type: none"><li>-Advanced Medium Range Air-to-Air Missile (AMRAAM)</li><li>-Air Intercept Missile (AIM) 9X</li><li>-Joint Stand-Off Weapon (JSOW)</li><li>-Tomahawk</li></ul>
Boeing Integrated Defense Systems, St. Louis, MO <ul style="list-style-type: none"><li>-JDAM</li></ul>
Boeing Integrated Defense Systems, Long Beach, CA <ul style="list-style-type: none"><li>-C-17</li></ul>

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directly above), and the theoretical considerations raised by DoD's 1999 PBA Study Group Report (touched on earlier), we selected just over 30 major military-unique defense acquisition programs with important PBA-like characteristics as case studies for review. These cases, each of which fits into one of the three basic cost-data exemption categories delineated in FAR Part 15.403-1, were selected because together they represent the broad spectrum of PBA-like features that the Air Force has used over the past decade in major defense-unique acquisition programs.<sup>26</sup> In addition, they span a considerable part of the continuum from pure CBA to pure PBA, as laid out in the PBA Study Group Report, and they represent a very rich array of defense system platforms, subsystems, armaments, and other defense-unique equipment. Finally, they have been taken from the four major Air Force product centers.

Table 1.4 lists all of the case studies by general product category.

**Table 1.4**  
**Case Studies**

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Aircraft	Air Armaments
–F-16	–JASSM
–C-17	–JDAM
–C-130J	–WCMD
–C-40	–AMRAAM
–T-6A	–AIM-9X
–RQ-1 Predator	–JSOW
–E-3C AWACS	–SLAM-ER
–E-8C JSTARS	
Aircraft Engines and Equipment	Space and Missiles
–GE F110	–EELV
–P&W F117	–DSP Satellite support
–GE J85 mod	–CSEL
–APG 68	–DAGR
–APG 63	–WGS
–AN/AAQ-13/14 LANTIRN	Other
–AN/AAQ-28 LITENING	–MLRS LRIP V
–B-1B TDS	–Javelin
	–Tactical Tomahawk

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<sup>26</sup> Two Army and two Navy programs were also examined based on expert recommendations. Several other programs reviewed are joint programs with the Navy or Army.

### Key Questions Asked

We based our structured interviews with DoD and industry officials who have working knowledge of these programs on an extensive questionnaire. The overarching themes investigated by the questionnaire are summarized here, organized into seven key questions:

1. Is there documented evidence that prices paid for major DoD weapon systems or defense-unique items have been reduced through the use of PBA compared with CBA processes?
  - a. How were these savings estimated?
  - b. What was the process by which PBA brought about these savings?
2. Is there documented or anecdotal evidence that PBA has reduced contractor overhead rates or charges?
3. Is there evidence that using PBA rather than CBA has shortened the acquisition process?
4. Is there evidence that the DoD acquisition workload has been reduced through the use of PBA?
5. Is there evidence that additional competitors (at the prime, subcontractor, or supplier levels), particularly companies that do not normally do business with DoD, have participated in DoD procurements as a result of PBA?
  - a. If so, can this participation be linked to lower prices paid and/or better products acquired?
  - b. Are there specific examples of commercial civilian technology from commercial companies being incorporated into a military system because of PBA and improving the capabilities of that system?
6. Is there documented evidence that the use of PBA has measurably increased contractor incentives to reduce cost through commercial-like incentive mechanisms?
  - a. Are contractors more likely to focus on cost reduction during design and development in a PBA versus a CBA program? What are the linkage and motivation provided by PBA?

- b. Are contractors more likely to focus on cost reduction during production with PBA since the contractor retains cost savings? How does the government realize a fair share of these savings?
7. What are the lessons learned for the future application of PBA?

We focused our research on questions 1 through 5. We chose to do this because we believed that the data available for analyzing the issues raised by these five questions would be more quantifiable.

## Report Organization

The remainder of this report consists of five chapters. While nearly all the government and industry officials we interviewed believed that PBA at least theoretically reduced price, overhead costs, workload, and schedule, few of them could provide us with specific quantifiable data to back up their beliefs. One important exception, albeit a partial one, occurs in the area of schedule and workload savings in the government proposal evaluation and contracting processes.

A basic understanding of the DoD contracting process—which is complex, demanding, and governed by a wide variety of statutes and regulations—is critical for any assessment of PBA’s efficacy and practicality. Chapter Two examines in some detail the typical schedule and workload of the government contracting process under the traditional, CBA process. It then makes a comparison with what might be expected under a typical PBA process. Chapter Two also identifies where in theory the savings in cost, schedule, and workload should occur when using PBA and looks at aspects of the CBA process costs as a way to shed light on the potential cost savings obtainable in theory through the use of PBA.

Chapter Three presents and discusses some of the overall views of PBA, its use, and its effectiveness that we obtained from our interviews with senior and working-level DoD and industry officials. This chapter focuses on the responses to the first four questions used in the interviews, all of which primarily involve cost, schedule, and workload savings related to streamlining the overall DoD contract man-

agement process and reducing DoD and contractor overhead costs. Contractor claims of reduced costs for proposal preparation and other contracting tasks under PBA are also discussed.

Chapter Four discusses and summarizes our analysis of a wide spectrum of PBA-like case studies as a way to test and expand on the issues and findings of Chapters Two and Three. The case studies are also used to more directly address some of the issues raised by questions 5, 6, and 7 of our interviews. Our analytical taxonomy of PBA-like case studies is presented and explained in greater detail, and the rationale for the continuum of approaches from pure CBA to pure PBA is reviewed. This chapter also briefly summarizes many of the case studies by category and subcategory of the taxonomy, reviews the key features of each program or type of program, and presents our observations about the appropriateness as well as the effectiveness and benefits of each type of approach used in the different categories.

Chapter Five addresses a number of other issues involving the implementation of PBA in DoD acquisitions. Issues raised by questions 5 and 6 of the interviews, which have to do with claimed PBA cost savings from enhanced competition through greater CMI and more commercial-like incentives for contractors, are addressed in detail; lessons learned from the implementation of PBA, other special issues, and future concerns are discussed; and specific implications for government cost estimators are addressed.

Finally, Chapter Six presents our overall findings on PBA as currently practiced by the Air Force. These findings are the product of drawing together and distilling the information from Chapters Two and Three and combining the outcome with a net assessment of the case studies laid out in Chapter Four and the implementation issues of Chapter Five.



## Overview of DoD Contracting Process and Comparison of CBA and PBA

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As pointed out in Chapter One, PBA advocates claim that one type of cost savings produced by using PBA is reduced overhead costs for both the government and the contractor. We expected that of all the types of savings these advocates claim, this one would be the most amenable to quantification and direct analysis, because the component overhead costs of administering large defense acquisition contracts would likely be fairly easy to identify and attribute to specific cost elements. Yet while PBA advocates commonly claim that significant savings can accrue in this area (in terms of cost, schedule, and workload), they do not normally present detailed analyses of precisely how these savings are realized.

We soon discovered that defense contracting is an incredibly complex process that is not easy to penetrate and deconstruct for purposes of analysis. Therefore, to assess the potential for savings in this area, and to assist in evaluating the claims of PBA advocates, we found it necessary to carefully lay out the contracting and oversight processes normally involved in major CBA defense acquisitions and to systematically compare those processes to the processes likely to take place in a PBA approach.

We begin here with a generic description of the typical activities that involve both DoD and contractor personnel and lead to award of a contract for a DoD MDAP<sup>1</sup> under CBA rules and procedures. We

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<sup>1</sup> See DoDI (DoD Instruction) 5000.2, 2003, Enclosure E3, for a definition of MDAP criteria.

do this for two basic scenarios, and we also review some post-award activities. We then present an analysis of how these activities are potentially changed if PBA is used. Finally, we compare the two, identifying areas in which cost, schedule, and workload savings might arise and the likely magnitude of some of those savings.

## **DoD and Contractor Actions in Contract Awards for Major Weapon Systems**

It would literally take volumes to document all necessary actions leading to and following contract award for an MDAP, and such a task is well beyond the scope of this effort. However, to better understand where cost and schedule savings from the use of PBA might occur, we first lay out the generic steps required to award a traditional, cost-based contract, after which we compare those steps to what would happen for the same award in a PBA environment. We do not consider documents prepared to meet an acquisition milestone decision but not related to award of contract or not influenced by how contract price is determined.<sup>2</sup>

A typical MDAP would have four major contract award events, each followed by a specific phase of the program, during its development and production:<sup>3</sup>

1. A pre-Milestone B<sup>4</sup> contract award to more than one contractor for the Concept Demonstration and Technology Development phase. In this phase, two or more contractors may be selected to

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<sup>2</sup> Examples of these documents are the System Acquisition Management Plan, Test and Evaluation Master Plan, and Live Fire Test Report.

<sup>3</sup> For more information on the phases, see DoDI 5000.2, 2003, p. 2.

<sup>4</sup> Currently, the MDAP milestones are Milestone 0 (Concept Studies Approval), Milestone A (Concept Demonstration and Technology Development Approval), Milestone B (System Development and Demonstration Approval), and Milestone C (Production and Deployment Approval). See DoDI 5000.2, 2003, for a complete discussion of the DoD milestone decision process.

- perform development work leading to a downselect to one contractor for the next phase of the program.
2. A System Development and Demonstration (SDD) phase contract award. Since the SDD phase is where DoD spends significant sums, there is often a downselect at Milestone B to the most promising contractor to continue development and eventual production of a weapon system. Although there are advantages to carrying more than one contractor beyond Milestone B, the expense of funding two efforts is often prohibitive, and DoD usually selects only one contractor or contractor team for this phase.<sup>5</sup>
  3. A sole-source production contract award to the winner of the SDD contract for the initial quantities of a weapon system, commonly called low-rate initial production (LRIP) phase.
  4. A sole-source follow-on, full-rate production (FRP) contract to the same contractor that produced the LRIP lot(s).

The following sections describe the government actions and corresponding contractor actions within the general contract-award timeframe. These actions are listed in chronological order; however, given the complexity of a major acquisition, many of them actually overlap during the process leading to contract award. The basic actions required of both government and contractor personnel to place a program on contract are similar in phases 1 and 2 (with perhaps fewer competitors in phase 2), and the same is true for phases 3 and 4. We thus decided to combine the similar phases to form two basic scenarios, noting differences between the two. For example, some actions that DoD must accomplish from scratch before a pre-SDD contract award are more along the lines of updates for an SDD contract award.

The two scenarios are depicted and discussed in the following two sections.

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<sup>5</sup> In an unpublished analysis of aircraft development costs, RAND analysts found that about 85 percent of the total development funds and, of course, all procurement funding were expended after Milestone B approval (the equivalent of Milestone B was formerly designated Milestone II).

### **Scenario 1: Actions Leading to Award of CBA PRE-SDD or SDD Contract**

This section discusses the actions for our scenario 1: the phase 1 and 2 activities constituting the award process for CBA pre-SDD or SDD contracts. Table 2.1 depicts this process; its elements are described in the following subsections. We also discuss the total time required for this process for weapon system contracts.

**Determine Requirements.** Like any buyer of a good or service, the DoD agency intending to acquire a product must describe what that good or service is and how it has to work, and must have some idea of its general cost and, if it must be developed, how much time its development and production will take. Within DoD, requirements determination can literally take years, during which concepts are analyzed, studies are conducted, competing systems are evaluated, etc. Although the formal contracting process does not require it, DoD must have at least some idea of what it wants before proceeding to the next phases of the contracting process.<sup>6</sup> In our view, whether an acquisition is PBA or CBA makes no difference in this phase.<sup>7</sup>

**Conduct Market Research.** Market research means collecting and analyzing information about capabilities and products within the marketplace that can satisfy an agency's needs.<sup>8</sup> The results of market research are used to determine whether there are commercial items or nondevelopmental items (NDIs) that can satisfy the requirements, or existing products that can be modified to meet the requirements.

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<sup>6</sup> This explanation describes how the requirements and acquisition processes are supposed to work, per DoD regulations and the FAR. There have been instances, however, in which contractors developed a new system (perhaps for a commercial use) and presented it to DoD or influential lawmakers, and DoD then developed a documented need for the system and described how it would be used operationally.

<sup>7</sup> It is important to note, however, that study contracts are routinely granted to private firms during the requirements and concept refinement phase (before Milestone A) to assist the government in developing precise requirements and system concepts, and during the technology development phase (before Milestone B) to help the government assess the maturity and applicability of appropriate technologies.

<sup>8</sup> As defined in FAR Part 2.101. For a full discussion of market research, see FAR Part 10.

**Table 2.1**  
**Activities Leading to a Development Contract Award Using CBA**

DoD Actions			Contractor Actions		
Baseline Using CBA		PBA Effects	Baseline Using CBA		PBA Effects
↓Phases 1 & 2↓	↓Phases 3 & 4↓		↓Phases 1 & 2↓	↓Phases 3 & 4↓	
Determine requirements	Update requirements	=	Conduct preliminary proposal work	Conduct preliminary proposal work	=
Conduct market research	Update market research	-			
Develop acquisition strategy	Update acquisition strategy	=			
Write acquisition plan	Update acquisition plan	=			
Develop source selection strategy/plan	Update source selection strategy/plan	=			
Post GPE notice and draft solicitation on electronic bulletin board	Post GPE notice and draft solicitation on electronic bulletin board	=			
	Prepare sole-source J&A	=	Prepare proposal	Prepare proposal	++
Prepare and distribute solicitation	Prepare and distribute solicitation	=			
Receive and evaluate proposals	Receive and evaluate proposal	++			
Obtain DCAA and DCMA reports for CO	Obtain DCAA and DCMA reports for CO	++	Support DCAA and DCMA analyses	Support DCAA and DCMA analyses	++
Conduct fact-finding activities at contractor facilities	Conduct fact-finding activities at contractor facility	++	Support fact-finding activities at plant	Support fact-finding activities at plant	++
Conduct discussions	Conduct discussions	=	Participate in discussions	Participate in discussions	=
Request final proposals	Request final proposal and obtain certified cost or pricing data	=	Prepare final proposal	Prepare final proposal and supply certified cost or pricing data	++
Evaluate final proposals and write contracts	Evaluate final proposal	++			
Conduct source selection authority briefings, approve decision/contracts, and award contracts	Conduct negotiations, write PNM, and write/ approve/award contract	+		Participate in negotiations	+
Conduct post-award audits (DCAA)	Conduct post-award audits (DCAA)	++	Support post-award audit activities	Support post-award audit activities	++
			Submit EV costs and CCDRs periodically	Prepare and submit CCDRs by production lot	++

NOTE: See Table 2.3 and discussion on page 46 for a complete explanation of this table and how it is intended to be read.

This research often includes analyzing component products available, as well as entire systems. In addition, it involves determining the practices of firms engaged in producing, distributing, and supporting commercial items, such as terms for warranties, buyer financing, maintenance and packaging, and marketing. The extent of the market research varies depending on such factors as urgency, estimated dollar value, complexity, and past experience. Methods of conducting market research can include contacting knowledgeable individuals in government and industry regarding market capabilities; reviewing the results of other, recent market research undertaken to meet similar or identical requirements; publishing formal requests for information in appropriate technical or scientific journals or business publications; querying a governmentwide database of contracts and other procurement instruments intended for use by multiple agencies (available at [www.contractdirectory.gov](http://www.contractdirectory.gov)), as well as other government databases that provide information relevant to agency acquisitions; participating in interactive, online communication among industry, acquisition personnel, and customers; obtaining source lists of similar items from other contracting activities or agencies, trade associations, or other sources; reviewing catalogs and other generally available product literature published by manufacturers, distributors, and dealers or available online; and conducting interchange meetings or holding pre-solicitation conferences to involve potential offerors early in the acquisition process.

**Develop Acquisition Strategy.** Once the requirements are scoped, a strategy is developed to acquire the means to meet the requirement. The acquisition strategy addresses requirements, program structure, acquisition approach, risk, program management, design considerations, support strategy, and business strategy. The business strategy includes the contracting approach (major contracts planned, contract type(s), contract incentives, performance management, integrated baseline reviews, special terms and conditions, warranties, and component breakout) (DAU Program Managers' Tool Kit, 2002). It is the program manager's overall plan for satisfying the

mission need in the most effective, economical, and timely manner,<sup>9</sup> and it can be an early indicator of whether DoD is going to use traditional CBA, or PBA methods.

**Write Acquisition Plan.** The acquisition plan basically lays out all the information related to a particular system's forecast acquisition activities.<sup>10</sup> It includes milestones at which decisions should be made, and it addresses the technical, business, management, and other significant considerations that will control the acquisition. Its specific content varies depending on the nature, circumstances, and phase of the acquisition. The plan includes the statement of need, including alternatives; conditions affecting the acquisition (such as ability to operate with other systems); cost and schedule and performance constraints, and their interrelationships; risks; prospective sources; competition sought; source selection procedures; contract type and use of multi-year contracting, options, or other special contracting methods; budget estimates; management systems and information required for contract monitoring; test and evaluation procedures; logistics considerations; data rights; government-furnished equipment, property, and information; environmental issues; security considerations; contract administration information; and dates for key events.

**Develop Source Selection Strategy/Plan.**<sup>11</sup> Normally, the CO is the source selection authority; but for larger programs, the source selection authority may be as high as a service secretary. The purpose of the entire source selection effort is to choose the best offeror for a weapon system program. Hence, a strategy and documented plan describing how that selection will be made must be developed. The source selection strategy/plan tells what organizations will be represented on the proposal evaluation team (e.g., appropriate contracting, legal, logistics, technical, and other expertise). It also addresses evaluation factors for the selection, solicitation provisions or contract

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<sup>9</sup> See DFARS 34.004 for acquisition strategy.

<sup>10</sup> See FAR Part 7 for a complete discussion of acquisition plan development.

<sup>11</sup> Source selections are addressed in FAR Part 15.3.

clauses, and data requirements. The strategy/plan must be approved by the source selection authority before the solicitation is released.

**Post Government Point of Entry Notice and Draft Solicitation on Electronic Bulletin Board.** Before the Internet was available, a “synopsis” was published in the *Commerce Business Daily* to announce each proposed federal government contracting action exceeding \$25,000. Since October 2001, however, the CO transmits all notices to the GPE Web site for dissemination.<sup>12</sup> The FAR lists three reasons for this public dissemination:

1. Increase competition.
2. Broaden industry participation in meeting government requirements.
3. Assist small business concerns, veteran-owned small business concerns, service-disabled veteran-owned small business concerns, HUBZone small business concerns,<sup>13</sup> small disadvantaged business concerns, and women-owned small business concerns in obtaining contracts and subcontracts.<sup>14</sup>

The notice must be published at least 15 days before issuance of a solicitation except in the case of acquisitions of commercial items, for which a shorter period may be specified.

**Prepare and Distribute Solicitation.** Solicitations are a request from the federal government for contractors to submit offers or quotations for a particular proposed contracting action.<sup>15</sup> Solicitations under sealed bid procedures are called invitations for bids; solicita-

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<sup>12</sup> The GPE, which is the single point where government business opportunities greater than \$25,000 (including synopses of proposed contract actions, solicitations, and associated information) can be electronically accessed by the public, is at <http://www.fedbizopps.gov>. See definitions in FAR Part 2.101.

<sup>13</sup> A HUBZone small business concern is one that appears on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration. See definitions in FAR Part 2.101.

<sup>14</sup> See policy under FAR Part 5.002.

<sup>15</sup> See FAR Part 5 for specifics on solicitations.



tions under negotiated procedures (which are the norm for weapon system procurements) are called requests for proposal (RFPs). The CO establishes a solicitation response time that affords potential offerors a reasonable opportunity to respond to each proposed contracting action. Except for the acquisition of commercial items, at least a 30-day response time for receipt of bids or proposals from the date of issuance of a solicitation must be allowed. At least a 45-day response time for receipt of bids or proposals from the date of publication of the notice is required for proposed contracting actions categorized as R&D.

**Receive and Evaluate Proposals.** Proposals from competing contractors are delivered to the government at the specified time and place and in the prescribed format, with electronic media or briefings often being the preferred format. Each contractor's proposal must describe the technical, cost, and programmatic details of how that contractor would approach and meet the requirements specified in the RFP. The evaluation factors on which the award decision is based are identified in the RFP, although how the government plans to evaluate those factors need not be stated. The evaluation factors are tailored to each program but must encompass key areas of importance and emphasis in the selection, must allow for discrimination among contractors' proposals, and must be prioritized. Although these factors are chosen by DoD, price or cost must also be evaluated as a factor for all proposals.

Other factors considered may include quality of the product or service, technical excellence, small business utilization, management capability, and personnel qualifications. Beginning in 1999, past performance on government contracts became a mandatory evaluation factor on negotiated competitive contracts with expected values of \$100,000 or more. At the pre-Milestone B phase of a program, the technical aspects and proposed solutions tend to constitute more of the volume of the proposal than the cost section does. However, given that the contract for development phases is normally a cost-plus contract and that an evaluation of the price or cost is required, much emphasis is placed on proposed costs. The government evaluators normally analyze each contractor's technical solution and develop

their own assessment of the most likely costs of each contractor's effort, called a cost realism analysis, which is then used instead of the contractor's estimated costs in the evaluation. In the past, the cost documentation in a contractor's proposal could be voluminous. If the contract is being awarded under a competitive environment, certified cost or pricing data are not required, but the cost data submitted have to be sufficient for the government to develop the cost realism analysis from them.

**Obtain DCAA and DCMA Reports for CO.** Members of the Defense Contract Audit Agency (DCAA) and the Defense Contract Management Agency (DCMA) aid—or, indeed, are part of the government evaluation team. The DCAA auditors normally focus on the costs in the proposals and check the labor rates, overhead rates, general and administrative rates, etc., previously negotiated or forecast for a particular contractor's plant against those used in the proposal. One of their key assignments is to assess the impact of the proposed new business on the rates at a particular facility, under the theory that the additional business brought into the plant with the new contract would tend to reduce the rates charged not only for the new work, but also any existing work at the facility. The DCMA officials focus on the technical aspects of the proposals and assess whether the proposed objectives and work can be accomplished with the number of hours (usually engineering hours are the bulk of the direct effort for the development phase of a program) in a contractor's proposal. Both agencies are given 45 days to complete their assessments and provide their reports to the CO.

**Conduct Fact-Finding Activities at Contractor Facilities.** At the discretion of the government evaluators, a physical visit may be made to the contractor facilities where the proposed work is to be accomplished. This activity often overlaps with the DCAA and DCMA evaluations, which may be a substitute for an actual visit to the facility. The travel time and preparation for fact-finding visits can consume up to two weeks of effort by government evaluators.

**Conduct Discussions.** A contract can be awarded without post-proposal discussions taking place between the government evaluators and the contractors.<sup>16</sup> However, these discussions, sometimes conducted as part of the fact-finding visits, can be used to increase the government evaluators' understanding of the proposals. This is also the point at which the CO can carry out his/her responsibility for informing contractors of deficiencies, weaknesses, and any adverse past performance information to which they may want to respond. In addition, if it looks likely that a contractor is within the competitive range and could be awarded a contract, the CO can suggest substantive ways to improve the contractor's proposal.

**Request Final Proposals.** After the discussions with the CO, the contractors update their proposals and submit their final offers to DoD. Although contractors technically can submit updates only for areas of weakness identified by the CO, they often update the entire proposal and submit it. The proposal submitted at this point is often called the best and final offer (BAFO).

**Evaluate Final Proposals and Write Contracts.** When the BAFO represents an update of the entire proposal, the evaluation team must begin anew, reviewing the entire document and updating its scoring of the factors for each contractor. Although the BAFO can represent modification of any section(s) of a proposal, its normal focus is on final prices or cost figures. Following review of the BAFOs, a contract is written for the likely winner(s) so that it can be approved in conjunction with or shortly after the source selection authority's decision on the winner(s). The profit percentage objective on the cost-plus contract is also developed at this point, along with the award or incentive fee structure. For cost-plus development contracts involving a fixed fee, the limit on profit is normally 15 percent of the estimated contract costs.

**Conduct Source Selection Authority Briefings, Approve Decision/Contracts, and Award Contracts.** The working-level evaluation team develops a briefing that summarizes the outcomes of the

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<sup>16</sup> See source selection, FAR Part 15.3, for a complete treatment of the restrictions and processes that govern discussions between the government and offerors.

contractors' proposal evaluations and presents it to the source selection authority. Within DoD, the size of the contract dictates who the source selection authority will be, and it is this person who independently decides the winner(s) after being provided with the advice, opinions, and analyses of the evaluation team (called the Source Selection Evaluation Team) and the Source Selection Advisory Committee (SSAC). The source selection authority also approves the contract for award to the winner(s). After the decision is publicly announced, the contracts are awarded. For multiple winners, the contracts do not have to be the same, since the proposed approaches, rates, etc., will differ by contractor. Contract amounts will most likely differ for each contract, as well, even though the basic objectives for the competing development efforts remain the same.

**Conduct Post-Award Audits.** Following contract award, DCAA audits each contractor's financial, purchasing, and other records related to contract award to ensure that costs used in the proposal are substantiated by prices paid to suppliers for similar items or that labor rates are current as of the proposal date. DCAA has 30 days to do a post-award audit. One technique DCAA uses is to compare a sample of items from the contractor's contract bill of materials for the contract work against the actual costs paid for like items in the contractor's accounting system as of the proposal date. In addition, since the contracts are cost plus fee, DCAA periodically conducts audits to ensure costs charged to the government under the current and other contracts are accurate and that the contractor's accounting systems are valid (i.e., conform to government standards).

**Submit Earned Value Costs and Contractor Cost Data Reports Periodically.** During the life of a cost-plus contract for an MDAP, the contractor is periodically required to submit earned value (EV) reports showing how the program's progress compares with the planned schedule and cost milestones. Because development contracts are normally cost plus, the government wants to be aware of any early indications that the program is not on schedule or on cost. These EV reports, which are also often used by the contractor for internal man-

agement of the contract, are submitted periodically (normally monthly) and thus show the status of the contract work over time.<sup>17</sup>

In addition to these continuing EV reports, DoD often requires cost reports (called Contractor Cost Data Reports, or CCDRs) at specified program milestones, such as at critical design review or first flight. The CCDRs are snapshots of the accumulated actual costs arrayed by Work Breakdown Structure (WBS)<sup>18</sup> element as of a certain event. In production, actual costs are normally reported in CCDRs at the completion of each production lot. The CCDRs are basically a cost data collection for use in generating future cost estimates on similar systems that may be planned for development. These costs are used in populating cost databases and developing cost models. The value of these actual costs (“actuals”) from the current program that generates them is usually very limited (some would say “worthless”), since contract management focuses on the EV reports and estimators at the SPO normally have much greater access to the current costs being incurred by the program.

**Weapon System Contract Awards: Total Time Required.** If all the minimum times for the steps discussed above are added up, the net result is around six months from the first government notice for proposals to the completion of post-award audit. Not included in this tally are all the steps preceding first notice (such as developing the acquisition strategy), which can take years, especially in the case of a complex weapon system. The time needed to complete the process

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<sup>17</sup> Sometimes the “reporting” does not take this shape. Some DoD contractors allow the SPO continuous access to their cost collection systems. In this case, specific reports are not generated per se; instead, both the contractor and the government personnel can conduct their own periodic or continuous reviews of the data.

<sup>18</sup> WBS has been defined as “a product oriented family tree of hardware, software services, data and facilities. The family tree results from systems engineering efforts during the acquisition of a defense material item.” The WBS “displays and defines the product or products to be developed and/or produced. It relates the elements of work to be accomplished to each other and the end product.” “The work breakdown structure forms the basis for reporting structures used for contracts requiring compliance with the Earned Value Management System (EVMS) Criteria and reports placed on contract such as Contractor Cost Data Reporting (CCDR), Cost Performance Reports (CPR), Contract Funds Status Reports (CFSR), and Cost/Schedule Status Reports (C/SSR).” MIL-HDBK-881, 1998, pars 1.6.3 and 1.5.

for an average program in normal circumstances easily takes about one year, however. So this is the important timeframe to keep in mind when assessing the schedule or cost savings attributable to PBA compared with CBA.

### **Scenario 2: Actions Leading to Award of Sole-Source LRIP or FRP CBA Contract**

This section discusses the actions required under a sole-source LRIP or FRP CBA contract award—or, as we are calling it, scenario 2, which consists of phases 3 and 4 of a program's acquisition cycle. Table 2.2 shows the relevant actions, focusing on the differences between the procedures for this type of contract award and those for the competitive award made prior to Milestone B (see Table 2.1).

As Table 2.2 shows, many of the early actions prior to contract award are updates of documents, plans, strategies, etc., that were initiated during the contract award process for pre-Milestone B development activities. These are often government-only procedures and thus have little impact on the contractor's activities. Although DoD has awarded production contracts to more than one contractor in the past, that is not the normal situation for most weapon systems, particularly MDAPs, because of budget constraints and the quantities produced. A production contract for a developed weapon system is normally a sole-source award to the winning contractor from Milestone B, as long as technical, performance, and cost objectives have either been met during SDD or changed to reflect the realities of what is possible after several years of development work. Once an initial LRIP contract has been awarded to a single contractor, very rarely is the source decision revisited, so the remainder of the planned production is almost always awarded to the same contractor.

**Prepare Sole-Source Justification and Authorization.** One of the first differences is that the CO must prepare a sole-source Justification and Authorization (J&A). Because of the federal government's intention to foster competition and open procurements to all available offerors, the CO must justify in writing why a contracting action will take place without a competition being held. Some of the reasons

**Table 2.2**  
**Activities Leading to Sole-Source LRIP or FRP Contract Award Using CBA**

DoD Actions			Contractor Actions		
Baseline Using CBA		PBA Effects	Baseline Using CBA		PBA Effects
↓Phases 1 & 2↓	↓Phases 3 & 4↓		↓Phases 1 & 2↓	↓Phases 3 & 4↓	
Determine requirements	Update requirements	=	Conduct preliminary proposal work	Conduct preliminary proposal work	=
Conduct market research	Update market research	-			
Develop acquisition strategy	Update acquisition strategy	=			
Write acquisition plan	Update acquisition plan	=			
Develop source selection strategy/plan	Update source selection strategy/plan	=			
Post GPE notice and draft solicitation on electronic bulletin board	Post GPE notice and draft solicitation on electronic bulletin board	=			
	Prepare sole-source J&A	=	Prepare proposal	Prepare proposal	++
Prepare and distribute solicitation	Prepare and distribute solicitation	=			
Receive and evaluate proposals	Receive and evaluate proposal	++			
Obtain DCAA and DCMA reports for CO	Obtain DCAA and DCMA reports for CO	++	Support DCAA and DCMA analyses	Support DCAA and DCMA analyses	++
Conduct fact-finding activities at contractor facilities	Conduct fact-finding activities at contractor facility	++	Support fact-finding activities at plant	Support fact-finding activities at plant	++
Conduct discussions	Conduct discussions	=	Participate in discussions	Participate in discussions	=
Request final proposals	Request final proposal and obtain certified cost or pricing data	=	Prepare final proposal	Prepare final proposal and supply certified cost or pricing data	++
Evaluate final proposals and write contracts	Evaluate final proposal	++			
Conduct source selection authority briefings, approve decision/contracts, and award contracts	Conduct negotiations, write PNM, and write/approve/award contract	+		Participate in negotiations	+
Conduct post-award audits (DCAA)	Conduct post-award audits (DCAA)	++	Support post-award audit activities	Support post-award audit activities	++
			Submit EV costs and CCDRs periodically	Prepare and submit CCDRs by production lot	++

for awarding a contract under other than full and open competition are that (a) the product is available from only one responsible source and no other product meets the requirement, (2) the product is unique, (3) the government's costs to hold a competition are not expected to be recovered from a competition, and (4) a competition will cause unacceptable delays. For a contract greater than \$50 million, the service procurement executive must approve a sole-source justification or must delegate this action to a general officer or civilian equivalent in the procurement chain of command. The sole-source J&A negates the need for the source selection activities shown under scenario 1, since the winner is predetermined and the CO's task is to negotiate a fair and reasonable price for the production contract.

**Obtain Certified Cost or Pricing Data.** Because the system is unique due to sole-source J&A, the CO's job of determining a fair and reasonable price is difficult. If similar items are available in the marketplace, a sole-source award cannot be justified and a competition must be held. Hence, the CO must base his/her prenegotiation position for the contract on cost data, adding a profit percentage to the expected costs. Production contracts are normally fixed-price instruments, which, in contrast to cost-plus contracts, where DoD must pay the actual contractor-incurred costs plus a fee, treat the contractor's profit as a function of the contractor's actual costs subtracted from the negotiated contract price. However, the starting point for negotiating either a cost-plus or a fixed-price contract is basically the same: forecast costs to produce the system plus a percentage profit.<sup>19</sup>

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<sup>19</sup> A distinction should be made between how a fair and reasonable price is determined under CBA and how different types of contracts are executed. Under CBA, a basic contract price is derived from actual or projected costs to which a fee (profit) has been added. This methodology is the same whether the contract is cost plus or fixed price. The execution of the contract differs between the two types. In a cost-plus contract, the contractor attempts to meet the program goals within the estimated cost and is paid a profit on those incurred costs. If there is an overrun or underrun, the contractor is normally still paid the actual costs plus a percentage of the costs as profit/fee, within certain limits. In a fixed-price contract, a price is set, and overruns or underruns either reduce or increase, respectively, the contractor's profit by a like amount, since the government pays the contract price regardless of actual costs. Although there can be variations to the fixed-price concept, such as an award fee for certain performance objectives, we only address the basic cost-plus and firm-fixed-price contracts here. See FAR Part 16 for the various types of contracts available to COs.



Although certain programs do not require actual costs—notably Air Force guided munitions programs in which production price commitments were required as part of the Milestone B competitively awarded development contracts—the DoD norm is to collect actual costs for building development items and to use those data to forecast likely costs for low-rate production. As part of that process, COs ask the contractor for actual cost data from development and then use them as a starting point for negotiating production contract costs.

Congress enacted Public Law 87-653, the Truth in Negotiations Act (TINA), in 1962 to ensure that data supplied by a contractor to the federal government and used in making a fair and reasonable pricing determination in a noncompetitive contract award are accurate (Riemer, 1997, p. 50). Contractors submitting inaccurate data that result in a higher negotiated price can be charged with defective pricing, and such charges have potentially serious legal consequences. Hence, as part of their final proposals, contractors must perform a “sweep” of their accounting systems to verify that all of the cost data they supply are accurate as of the date of the proposal. Along with the data, the contractor must submit a Certificate of Current Cost or Pricing Data (SF 1411) signed by a company officer. These accounting system sweeps take about 30 days.

**Conduct Negotiations, Write Price Negotiation Memorandum, and Write/Approve/Award Contract.** In a competitive situation, contract award is normally based on the proposals and may or may not require further negotiation. With a sole-source award, the CO normally conducts negotiations on aspects of the proposal that he/she disagrees with or does not understand. Whether or not negotiations occur with a sole-source contract, however, the CO must write his/her negotiating position for elements of the contract to be awarded—called prenegotiation objectives—before awarding a contract or entering final negotiations with the contractor. Following negotiations, the CO prepares a Price Negotiation Memorandum (PNM). This documentation is crucial for showing how a fair and reasonable price was determined, especially later, when auditors

review the government paperwork supporting the price of the contract.<sup>20</sup>

**Prepare and Submit CCDRs by Production Lot.** For production contracts, EV reporting is not usually required, but CCDRs normally are for each production lot. In the past decade or so, this reporting has been increasingly criticized by acquisition reform advocates, some of whom claim that cost reporting adds as much as one percent to contract prices.<sup>21</sup>

## Potential Savings from Using PBA in Contracting Scenarios

Having laid out the typical actions of a CBA contract award process, we now compare them to the actions of a PBA contract award process and identify where savings in cost, schedule, and workload are likely to arise. Table 2.3 shows the actions from Tables 2.1 and 2.2, each accompanied by a symbol to indicate changes in savings (in terms of cost, schedule, and/or workload) that might be effected by the use of PBA. As can be seen, the use of PBA rather than CBA would, in theory, bring about no change in savings in some instances (designated by “=”); small savings (or cost avoidances) in others (designated by “+”); and discernibly large savings in yet others (designated by “++”). In addition, one case (designated by “-”), shows a negative change in savings as the potential effect. Note that these savings and cost avoidances<sup>22</sup> stem from changes to the individual actions that

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<sup>20</sup> FAR Part 15.406-3 describes the required contents for a PNM.

<sup>21</sup> See Lorell and Graser, 2001, for an assessment of this topic.

<sup>22</sup> As noted earlier, we define these two terms in accordance with AFI 38-301, *Productivity Enhancing Capital Investment Program*, 15 February 2002, Attachment 1, and, in the process, substitute the term *savings* for *hard savings* and the term *cost avoidance* for *cost-avoidance savings*. Thus, we define *savings* as “[b]enefits you can precisely measure, quantify, and place under management control at the time the benefits occur. These savings can be reflected “as specific reductions in the approved program or budget after you have obtained them. Examples include . . . manpower authorizations costs or funded workyear reductions, reduced or

make up the contract-award process, and are not the effect of PBA on the entire program, which is covered in more detail in Chapters Three through Five.

In the interest of brevity, the discussion does not include actions shown in Table 2.3 that do not change appreciably in time, schedule, or workload. Again, we want to emphasize that this is a theoretical assessment based on what we think might be expected to happen given our detailed comparisons of the differences in the process under PBA compared with CBA. Chapter Three presents additional information, derived from interviews with acquisition and industry officials, on the claimed or actual savings in cost, schedule, and workload in real programs that have had PBA-like characteristics.

### **Conduct Market Research**

All contract awards require market research, but market research done under PBA puts a burden on DoD cost and price analysts and COs because they have to determine a fair and reasonable price without the aid of the actual or estimated cost data that the contractor furnishes under CBA. This is particularly the case when there is no civilian market for products similar to the item sought. The additional research will take time, but it is difficult to even speculate about whether it would require a longer schedule. Many factors—system complexity, availability of historical cost data for similar systems, market pricing information on commercial items, etc.—would greatly impact the time required for this research.

### **Prepare Proposal**

For the contractor, proposal preparation is the first area of likely savings. Being able to submit a proposal containing minimal or no

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removed operating costs (such as utilities, travel, and repair), and reduced or removed parts and contracts.” We define *cost avoidances* as “[b]enefits from actions that remove the need for an increase in manpower or costs and would be necessary if present management practices continued.” A cost avoidance “enables you to reach a higher level of readiness or increased value (quantity, quality, or timeliness) of output without increasing staffing or cost, or absorb a growing workload without increasing staffing or cost.”

**Table 2.3  
Potential Effects of Using PBA**

DoD Actions			Contractor Actions		
Baseline Using CBA		PBA Effects	Baseline Using CBA		PBA Effects
↓Phases 1 & 2↓	↓Phases 3 & 4↓		↓Phases 1 & 2↓	↓Phases 3 & 4↓	
Determine requirements	Update requirements	=	Conduct preliminary proposal work	Conduct preliminary proposal work	=
Conduct market research	Update market research	-			
Develop acquisition strategy	Update acquisition strategy	=			
Write acquisition plan	Update acquisition plan	=			
Develop source selection strategy/plan	Update source selection strategy/plan	=			
Post GPE notice and draft solicitation on electronic bulletin board	Post GPE notice and draft solicitation on electronic bulletin board	=			
	Prepare sole-source J&A	=	Prepare proposal	Prepare proposal	++
Prepare and distribute solicitation	Prepare and distribute solicitation	=			
Receive and evaluate proposals	Receive and evaluate proposal	++			
Obtain DCAA and DCMA reports for CO	Obtain DCAA and DCMA reports for CO	++	Support DCAA and DCMA analyses	Support DCAA and DCMA analyses	++
Conduct fact-finding activities at contractor facilities	Conduct fact-finding activities at contractor facility	++	Support fact-finding activities at plant	Support fact-finding activities at plant	++
Conduct discussions	Conduct discussions	=	Participate in discussions	Participate in discussions	=
Request final proposals	Request final proposal and obtain certified cost or pricing data	=	Prepare final proposal	Prepare final proposal and supply certified cost or pricing data	++
Evaluate final proposals and write contracts	Evaluate final proposal	++			
Conduct source selection authority briefings, approve decision/contracts, and award contracts	Conduct negotiations, write PNM, and write/approve/award contract	+		Participate in negotiations	+
Conduct post-award audits (DCAA)	Conduct post-award audits (DCAA)	++	Support post-award audit activities	Support post-award audit activities	++
			Submit EV costs and CCDRs periodically	Prepare and submit CCDRs by production lot	++

amounts of cost data (in other words, with a reduced Section L) would reduce the preparation effort, thereby reducing cost, schedule, and workload.<sup>23</sup>

In our visits to government offices and contractors, we asked for the costs of proposals for specific contracts. Table 2.4 shows the final negotiated contract value (price) and the reported or estimated proposal costs. As can be seen, the overall cost of proposal preparation is on average less than 1 percent of the negotiated contract value.<sup>24</sup> It is important to note, however, that these are solely the costs incurred by the prime contractor. For a complex system requiring certified cost or pricing data from the prime, subcontractors and suppliers that are expected to charge at least \$550,000 to the cost of the contract also have to prepare proposals and certified cost or pricing data, which are rolled into the prime's proposal to DoD.<sup>25</sup> The costs shown are those identified as a separate cost on the contract (or elsewhere) and do not include all overhead costs (such as maintaining the cost accounting system, extracting data for a proposal, and analysis). In our discussions, however, contractors pointed out that preparing the technical portions of a proposal was a much greater part of the overall proposal costs during development, whereas preparing the cost data portions constituted the preponderance of the proposal costs in later production lots, when the technical issues had been fairly well solved. Overall, proposal costs tended to decrease as the weapon system matured

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<sup>23</sup> FAR Part 15.204 describes the uniform contract format that COs must use to prepare solicitations and that guides the format of responses from contractors and all resulting contracts. This format includes a "Section L," which contains "Instructions, conditions, and notices to offerors and respondents." Section L may include instructions to offerors or respondents to submit proposal data in a specific format to facilitate evaluation. Covered data include "cost or pricing data . . . or information other than cost or pricing data." See FAR Part 15.204-5 Part IV (b)(5).

<sup>24</sup> Table 2.4 represents inputs from a number of contractors and SPOs. Since we did not have access to the database of all contracts awarded, we cannot state whether this group of contracts is statistically valid as a sample. However, our discussions with practitioners led us to believe it is a reasonable representation of proposal costs, at least for production contracts.

<sup>25</sup> This is not required for any parts of the program covered by the contract that the prime intends to compete.

**Table 2.4**  
**Total Contract Value and Reported Proposal Costs of Selected Contracts**

Contract Type	Phase	Contract Value (in \$ millions)	Proposal Cost <sup>a</sup> (in \$ thousands)	Proposal Cost as Percentage of Contract Value
FP	Production	285	883	0.3
FP	Production	35	184	0.5
FP	Production	119	70	0.1
FP	Production	47	none <sup>b</sup>	0.0
FP	Production	7	118	1.6
FP	Production	11	74	0.7
FP	Production	43	482	1.1
FP	Production	396	212	0.1
FP	Production	5	55	1.0
FP	Production	26	187	0.7
FP	Production	30	223	0.7
FP	Production	331	1,019	0.3
FP	Production	11	109 <sup>c</sup>	1.0
CP	Development	95	500	0.5
CP	Development	236	1,500	0.6
CP	LRIP	78	600	0.8
CP	LRIP	88	500	0.6
FP	Production (1 year plus options)	740 (all years)	750	0.1
FP	Production	109	150 (Alpha Contracting <sup>d</sup> )	0.1
FP	Production	19	80 (PBA + Alpha)	0.4
FP	Production	14	53	0.4
FP	Production	1.6	80	4.9
FP	Production	1.6	99	6.0
FP	Production	2.4	149	6.3
FP	Production	0.124	17	13.4
FP	Production	285	883	0.3
FP	Production	35	184	0.5
FP	Production	35	471	1.3
FP	Production	42	195	0.5
Average (Contracts > \$10M)				0.6

<sup>a</sup> Identified by prime contractor only.

<sup>b</sup> No cost because it was combined with another proposal.

<sup>c</sup> Estimated as a cost avoidance by the SPO.

<sup>d</sup> Alpha Contracting is discussed in Chapter Three.

from development to production. Some very large major systems had proposal costs of \$4–5M for development, whereas later in production, these costs might be less than \$100,000 for a follow-on lot.

### **Receive and Evaluate Proposals**

A second area of savings for DoD is in the reduced amount of work needed to evaluate what should be a smaller, shorter, and simpler proposal under PBA. The theory is that a proposal not containing large quantities of cost data is easier and quicker to evaluate and makes the task of readily determining a fair and reasonable price less complex. Even if this theory is true, however, the workload savings are unlikely to translate into significant cost savings. This is because the acquisition workforce has already been significantly downsized, which means that even if the remaining DoD evaluators were to experience work reductions due to the claimed less-demanding requirements of PBA proposal evaluation, they would likely remain on the DoD rolls. Thus, PBA proposal evaluation may result in cost avoidance rather than a true cost savings, since the government evaluators will likely have time to work on other projects requiring their attention. However, since a smaller proposal should be faster to read and evaluate, schedule savings could be possible, at least for cost and price analysts. Whether this would shorten the overall contract award schedule depends on whether this activity is on the “critical path” for the overall schedule.

### **Obtain DCAA and DCMA Reports (DoD), Conduct Post-Award Audits (DCAA), and Support Post-Award Audit Activities (Contractor)**

Under PBA, the contractor’s data are not used to determine prices, so the need for pre-award reports on the contractor’s cost data and for post-award audits presumably could be deleted, thereby saving manpower for these government organizations at the contractor’s plant. Again, this is probably more of a cost avoidance than a true cost savings, unless auditors are permanently released or reassigned. Contractor efforts in supporting these audits and reviews of cost data would also be eliminated under PBA. However, technical evaluations by DCMA personnel would not necessarily change. The potential for

schedule savings would be about the same as that for proposal evaluation savings.

### **Conduct Fact-Finding Activities**

Under PBA, fact finding could focus on technical, schedule, and other programmatic issues rather than on the evaluation of cost data. Again, this would be more of a cost avoidance for the government, and would provide a limited reduction of effort for the contractor in terms of the support it is required to provide for the cost or pricing data portion of the fact-finding visits.

### **Prepare Final Proposal and Supply Certified Cost or Pricing Data**

Under PBA, there would probably be no need for a BAFO, since BAFOs usually focus on the updated costs and final prices being offered rather than on technical content, schedule, or other issues. In addition, removal of the certified cost or pricing (TINA) requirement would save 30 days of cost accounting system sweeps, which most contractors and many government analysts already view as unnecessary. This is probably the one area where both cost avoidance and schedule savings could be realized with little impact on the outcome of the contract award process, whether it was CBA or PBA.

### **Conduct/Participate in Discussions and Evaluate Final Proposals**

The absence or reduction of contractor-supplied cost data under PBA could lead to a reduced workload for both the government and the contractor by allowing their discussions to concentrate on remaining technical and other issues rather than on cost data.

### **Prepare and Submit CCDRs by Production Lot**

One of the tenets of PBA's advocates is that PBA eliminates unnecessary reporting of the costs incurred by the contractor in fulfilling the contract. Although government analysts do not usually use CCDRs as a data source in determining likely costs for the next lot in production (since costs are not reported until a lot is complete, which may be two or three years later, when one or two additional lots are already on contract), DoD had required these reports for future sys-



tem cost estimating until recently, when the requirement was reduced or eliminated as a cost reduction measure.

There is no question that CCDRs require an expenditure of workload, although estimates of how much they really cost vary widely. According to some reports, contractors claim that the cost of setting up the software “crosswalk”<sup>26</sup> to accumulate the costs for a specific program and verifying the accuracy of the data for each production lot (or once or twice at some milestones during a development contract) is around \$1 million. Other reports indicate the effort involved is more like three staff months (i.e., less than \$75,000). DoD has long sought an objective answer to this question, but those involved in generating and verifying the reports at the contractor locations and in reviewing CCDRs in the SPO are not users of the data, so establishing a high price for CCDR preparation is a bias that should be recognized. In addition, contractors have little incentive to report their actual costs, since the CCDR is probably the government’s only available avenue for determining how much profit is really made on a fixed-price contract. Nevertheless, the effort would normally be eliminated under PBA, thereby saving workload and cost but not schedule, since this is a post-award event.

## **Summary of Theoretical Cost Savings from Using PBA in Contracting Process**

The magnitude and complexity of the actions that both DoD and contractors must perform to effect a contracting action are truly impressive, particularly considering that we have included in our discussion only those steps directly or indirectly related to contract award. As noted previously, there are numerous other documents required for a DoD MDAP to progress through milestone reviews.

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<sup>26</sup> For our purposes, a crosswalk is a computer routine used to extract cost data from a contractor’s cost accounting system and put them into a DoD-specified report format for the CCDR.

What we have shown are the areas that, in theory, should be most affected by switching from a CBA to a PBA process.

Only one area (market research) appears to experience an increased workload under PBA, whereas 11 areas appear to experience a significantly reduced workload, two appear to experience minor reductions, and 11 others appear to remain unchanged. It seems evident, however, that the PBA impact on the *overall* schedule and cost of actions leading to contract award are likely to be relatively modest, especially when one considers that contractors' direct proposal costs normally appear to be less than 1 percent of contract value.

The next chapter documents the views and experiences of DoD and contractors with respect to savings in contract management and overhead from PBA (as well as other aspects of PBA), and compares the claimed experiences with the theoretical expectations laid out in this chapter.

## **DoD and Contractor Views on PBA Effects on Contract Management and on Overhead Costs, Schedule, and Workload**

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This chapter presents a synopsis of the views of the experts we interviewed at DoD and contractor organizations about savings brought about by using PBA.<sup>1</sup> What we asked concerned both overall savings in general and savings in acquisition management, oversight, and other overhead areas in particular. These issues, which are discussed here in light of the theoretical contracting process savings (in cost, schedule, and workload) that could be expected to accrue from using PBA (see Chapter Two), coincide with the first four of the seven major overarching research questions at the core of this study (see Chapter One), which are basically as follows:

1. Have PBA savings been documented?
2. Have contractor overhead costs been reduced?
3. Has the acquisition process been shortened?
4. Has workload been reduced?

Thus, this chapter focuses on what DoD and contractor personnel who have actual experience with PBA report as claimed or actual savings in cost, schedule, and workload with respect to actions required to develop, propose, analyze, award, and manage a contract. The savings on overall program price that arise from enhanced com-

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<sup>1</sup> See Tables 1.1, 1.2, and 1.3 for a list of the interviewees.

petition, use of commercial items, etc., stemming from PBA are discussed in Chapters Four and Five.<sup>2</sup>

The majority of the experts interviewed were involved in contracting, cost or pricing analysis, or program management. Interviews normally lasted about two hours and were conducted on a non-attribution basis. Where specific programs are identified, the information came from open sources or was cleared by officials in the organizations visited. The results presented here represent the limited amount of data available on the various topics of interest and the majority opinions found among the interviewees, although contrary minority opinions are also documented.

One might expect bias on the part of DoD and contractor personnel—DoD supporting the “tried and tested” CBA, and contractors supporting PBA. Our overall impression from the interviews was that there was some bias, but not always in the direction we expected (for example, sometimes DoD personnel were more enthusiastic about PBA than their contractors were). Overall, we try to present as balanced a summary as possible, bolstered with anecdotal evidence provided by both groups. Some quantified cost data (such as reported proposal costs) were provided to us at some sites, but as the responses to question 1 show (see below), quantifying the results of PBA activities is, at best, extremely problematic.

In the following discussion, some of the views, factors, and circumstances overlap the individual questions about savings. We have eliminated as much repetition as possible.

## **Question 1: Have Savings Due to PBA Been Documented?**

The general consensus of both DoD and contractor personnel was that savings from PBA were not, and probably could not be, well documented in an accurate, analytically defensible manner. The reason for this lack of documentation is largely that there has been no

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<sup>2</sup> Our interviews were guided by a questionnaire sent out prior to the site visits. See Appendix for the actual questionnaire.

DoD or industry official direction to document savings (or even cost avoidance). In addition, a decision on a program to use PBA as opposed to CBA resulted in a different path through the processes and procedures to award a contract and develop/produce a weapon system. Thus, the “path not taken” under CBA for the same program in the same circumstances was not documented or even estimated. DoD did not even develop estimates of the savings for PBA versus CBA as an analytical case prior to commencing contract award activities, such as it must do for award of a multi-year contract, calculating the estimated savings and presenting them to the Office of Management and Budget and Congress.

However, despite this negative view of the ability to document PBA savings, DoD and contractor personnel overwhelmingly viewed PBA as theoretically capable of producing savings or at least cost avoidances because of its essential elimination of the requirement for contractor submittal of significant amounts of cost data. However, the magnitude of those process savings/cost avoidances was thought to be relatively small, which is especially apparent when one considers the magnitude of proposal costs compared to total contract costs (see Table 2.1). As one DoD official expressed it, “If the DoD asks for and evaluates less data, then it should save time and money, but whether this can be documented and evaluated is an open question.”

Another factor confounding the identification of PBA overhead and management process savings is that PBA implementation is only one aspect of the overall acquisition strategy. PBA is often accompanied by a host of other initiatives to reduce costs and save time. For example, statutory and regulatory relief measures, CAIV initiatives, competition, and other reform initiatives are often interwoven into the acquisition strategy. It would be impossible to document the savings from each of these initiatives separately, according to the majority of interviewees. One contractor stated the case as follows:

Once a program is designated as a PBA program, we size our staff and focus their efforts using those rules. We never staff up to a level to satisfy the requirements of a cost based program. However, my sense is that people are not furloughed, either.

Another impediment to the identification of savings can be inferred from the last sentence of this quotation. According to most interviewees, many of the functions (and people) that both DoD and contractors require prior to and following award of a CBA contract are not eliminated because of one or two PBA programs if the expectation is that later contracts will be awarded under CBA rules. Thus, if these people and their skills are expected to be necessary in later programs, their release because of a reduced current workload is unlikely, and without such personnel downsizing, overhead savings from PBA are likely to remain modest or nonexistent. However, when there is a workload reduction due to PBA on one program, those personnel might be assigned to help on another program in the short term as a way to avoid the cost of an increase in the workforce.

Further compounding the savings identification problem is the spectrum of activities involved in a PBA contract award. Award activity is sometimes quite straightforward, as, for example, when a previously negotiated price and quantity are used, allowing contract award to be accomplished with no more than a few pages of legal documentation implementing an option on a prior award. In these cases, there is virtually no proposal input or evaluation. In situations where there is no prior program experience on costs, however, the amount of required paperwork practically equals that of a CBA award process, with involved proposals, some cost data, and negotiations on price. Given that each PBA MDAP is basically a unique exercise, the multitude of factors involved makes it impossible to even compare across programs that are CBA or PBA. Thus, PBA's effect on each program is different, and even annual contract awards in the same program can use different approaches and experience different savings.

Nonetheless, some interviewees provided us with quantified examples of claimed savings that they attributed to PBA implementation.

On one program that had a long-term pricing agreement (LTPA)<sup>3</sup> between DoD and the contractor, the first LTPA incurred documented bid and proposal (B&P) costs of \$243,000. A second LTPA, a few years later, incurred B&P costs of only \$71,000, a savings that the organization involved primarily attributed to the eliminated requirement for TINA cost data. In addition, because of the LTPA, contract negotiation and price analysis had to be conducted only once every few years rather than annually.

On another program, savings documented for a negotiation involving five production lots was \$9 million lower than had been proposed because of PBA implementation.

In a third case, one SPO estimated that its contractor would have incurred an additional cost of \$150,000 if required to submit certified cost or pricing data with its proposal. In addition, it was estimated that DoD (SPO, DCAA, and DCMA) would have expended an additional 2,100 hours of effort in evaluating a fully TINA-compliant proposal.

Despite being meager, this evidence might have some merit were it not for the fact that it has little meaning: the interviewees were unable or unwilling to provide the data underlying their estimates of savings—or even overall program cost numbers to illustrate the relative scale of the claimed PBA savings on a programmatic level. Given these limitations, the analytical value of the estimates we were provided is very low.

In summary, DoD and contractor interviewees generally agreed that PBA, when properly implemented, can save on proposal preparation, proposal evaluation, and contract award costs. Many of those interviewed felt that the savings from PBA really were more of a cost avoidance. One prevalent view was that PBA freed up valuable staff resources to do other value-added work, and that this ability was one

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<sup>3</sup> An LTPA is basically a procurement contract with a base year and several prenegotiated option years. During the initial negotiation, DoD and the contractor normally agree to prices, quantities, and other contract specifics for the base-year buy and the option buys. Thus, following the base-year order, neither the government nor the contractor has significant paperwork to prepare for the subsequent annual orders.

of PBA's major benefits, especially given current pressures for workforce reductions. Nonetheless, despite scores of detailed interviews and in-depth discussions, we were unable to obtain meaningful, quantified data on overall PBA cost savings from the reduction in contracting effort. This proved to be a major disappointment and, because of our assumption that the area of overhead and management process costs was the one in which we would most likely be able to quantify savings (see particularly Chapter Two), raised serious doubts about the overall claims of savings from PBA.

As another possible way of obtaining quantifiable data relevant to this issue, we attempted to more specifically and in much greater detail examine the question of savings in the narrowly defined area of overhead rates and charges.

## **Question 2: Have Contractor Overhead Rates/Charges Been Reduced?<sup>4</sup>**

Contractors collect costs for developing and manufacturing DoD systems into various categories, but there are five basic categories: direct labor, direct material, overhead, general and administrative (G&A), and profit. Use of PBA could affect a contractor's costs in two of these: overhead and G&A costs, which pay for people who maintain cost accounting systems and prepare the cost portions of a proposal and who report costs on contracts in being. B&P costs, which are a separate indirect category under the G&A category, usually include the costs of technical, contracting, pricing, and administrative people involved in preparing proposals.<sup>5</sup> Since contractors that do business

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<sup>4</sup> We use *overhead* in a generic sense here, meaning indirect costs. Technically, contractors record their costs for preparing proposals in a bookkeeping category called "bid and proposal" costs, an indirect cost pool under the General and Administrative costs category, which is separate from the Overhead cost category. See Defense Systems Management College Press, 2001.

<sup>5</sup> Companies vary somewhat by which personnel charge to B&P costs. Some companies consider cost and price analysts to be part of overhead costs and their work on proposals is not separately identified, whereas other companies charge most proposal work to B&P.



with DoD are expected to prepare proposals in response to DoD RFPs, they are reimbursed for these expenses.<sup>6</sup> This reimbursement normally occurs through the application of the B&P costs via a rate per direct labor hour charged to programs being developed and/or manufactured by a contractor.

In theory, the technical content of a proposal should be the same whether a PBA or a CBA approach is used, and only the cost or pricing portion should be different. We say “theoretically” because in our discussions with DoD contracting officials, they expressed concern about not having been given the technical details (hours to be expended, materials consumed, etc.) they needed to properly determine whether a contractor fully understood a program’s scope and objectives and had estimated the appropriate effort (and therefore the appropriate cost) for achieving those objectives. Their focus was on avoiding a situation in which a contractor underbids to win the contract award and then might not be able to absorb a loss later, during contract execution, or might challenge every change DoD might later initiate in the program after the award. In a classic PBA sense, DoD should not care whether the contractor has accurately estimated its costs, as long as the risk of a contract default for nonperformance remains low—i.e., the contracting company is large enough and willing to absorb the loss and continue to sell at the contract’s agreed price even if the actual cost to meet the objectives is more than the company estimated.

Therefore, a PBA contract award process should result in the following:

- Elimination or significant reduction in the size of the cost section of a contractor proposal.
- Elimination or significant reduction in the efforts of the contractor’s cost and price analysts, with a resultant reduction in G&A

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<sup>6</sup> Contractors can also be reimbursed for unsolicited proposals, which are proposals they prepare that are not in response to a DoD RFP.

and/or B&P costs.<sup>7</sup> This should be particularly true if the need to supply certified cost or pricing data to meet TINA requirements as part of the proposal is eliminated.

- Elimination of workload for cost accountants and cost and price analysts due to the fact that no post-award cost reporting or auditing will be required. G&A or overhead costs should thus be reduced through the reduction of people needed to service the contract.

However, as in the case of overall process savings from PBA, serious methodological and definitional problems complicate the examination of overhead rates and charges in order to determine savings. A major part of the difficulty in determining whether indirect costs are reduced under PBA is the apparent inconsistency in how contractors identify proposal costs. The costs shown in Table 2.1 (see Chapter Two) were identified separately by the contractor, often as a separate CLIN<sup>8</sup> on the contract. In other cases, contractors' proposal costs were embedded in their overhead rates and not provided separately. At one Air Force product center, DoD contracting personnel noted that proposal costs on their contracts were rarely identified, except for engineering change orders (ECOs) on existing contracts. In one program, the cost of the proposal for the following two lots under a PBA contract was covered under the scope of the then current lot, so no separate charges were identified.

To further compound the problem of determining true proposal costs, all sources stated that the costs they provided to us were only the "direct" costs—i.e., those for individuals who charged their work specifically to a proposal charge number. They pointed out that much

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<sup>7</sup> As noted earlier, companies vary somewhat in their treatment of the categorization of cost and price analysts and their cost accounting system. In some, G&A is considered a corporate-level expense that covers costs related to several locations maintained by the same company. In these cases, cost and price analysts and the cost accounting system may be charged to an overhead account unique to each company site. At other companies, they may be charged to G&A expenses applicable to all corporate locations.

<sup>8</sup> A CLIN, or Contract Line Item Number, is a means of identifying separate deliverables on a contract.

effort was expended behind the scenes by people such as cost analysts and pricing personnel, who charged their time indirectly to an overhead account. In addition, no prime contractor we interviewed captured the proposal costs of its subcontractors or suppliers, which would also have B&P and other indirect costs in their rate structures if they were involved in a significant amount of DoD business.

Finally, a major complication in trying to determine PBA's effects on contractor overhead rates is the complexity of the rates themselves. Aside from the need to collect costs into the various categories, a contractor's "wrap" rates (proposal and billing rates) are a function of the costs divided by the allocation basis, which is normally direct labor hours. In simple terms, costs are forecast, the business base (labor hours) is forecast, and the costs are then divided by the business base to determine a forecast wrap rate for the entire business entity (a specific location or the entire corporation). These rates are normally used for all DoD business at a location (and may be used for all activities, including commercial work, at the same location). Since these rates can vary from year to year because of changes in either cost or level of workload, a comparison of rates is not a satisfactory way to assess PBA impacts unless there is excessive "normalization" among years being compared.<sup>9</sup> With few exceptions (for example, the company that reported establishing a separate G&A pool for military CBA contracts), all activities pay for the overhead burden of maintaining a Cost Accounting Standards (CAS) compliant accounting system and personnel on board who are knowledgeable about preparing DoD proposals and providing cost data for post-award use by DoD. Thus, even if a particular PBA program saves overhead costs because of reduced proposal preparation and post-award cost reporting, those savings will be lost in the sea of costs for all programs. This was noted by one DoD pricing analyst, who said: "Even with rates merged for both commercial and military business at that plant, rates have actually increased over the last year."

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<sup>9</sup> A detailed study by on-site DCAA auditors might provide the details needed to make such an evaluation, but such a study would have to be directed by DoD procurement officials.

Keeping these difficulties in mind, we still sought to develop at least some insight into the magnitude of possible reductions in this area due to PBA. To scope the effort involved, recall that Table 2.1 shows proposal costs for prime contractors being on average about 0.6 percent of the total contract value for large contracts (over \$10 million) in a small sample of contract values and proposal costs provided to us by DoD and contractor personnel. Several contractors estimated that of the total proposal costs, the amount attributable to supplying cost data under CBA was between 20 and 80 percent of total proposal costs (or 0.12 to 0.48 percent of the total contract award value), with the percentage depending on the volume and quality of the cost data provided and the type of contract. In addition, several noted that the effort to collect and provide cost data is typically a smaller percentage on a development contract proposal (where the focus is on technical efforts, and proposal costs tend to be higher) than on a follow-on production contract (where technical descriptions are unnecessary, and the focus is on actual cost data from previous production lots).

One contractor's comments are typical:

I would estimate that of the total costs of developing a proposal for a new system, 10% is spent doing the cost/price proposal. Of that, 10% is spent certifying the data [TINA certification].

These percentages would place PBA savings at about 0.06 percent of the contract value and TINA savings at a miniscule 0.006 percent if applied to the average contract in our sample.

What did we learn from our interviews about the reduction of overhead (indirect) costs due to implementation of PBA? The general consensus was that eliminating even certified cost or pricing data saved little in terms of overall contract prices. One DoD CO noted that despite contractors' protestations that it was costly to provide cost or pricing data, they seldom reduced their price when the possibility of eliminating the data requirement came up in negotiations. Another stated:

Contractors will advertise that there is a high cost for TINA/cost data, that PBA saves a lot on proposal prep costs, but they are unwilling to give it to you in negotiation. Then they claim there is not so much cost savings, as cost avoidance. Contractors will claim that “If you hadn’t eliminated these costs, the price would have been even higher.”

There appear to be several reasons for this lack of identifiable indirect cost reductions from PBA. First, although PBA implementation on one program may result in savings, contractors cannot eliminate their CAS compliant collection and reporting system, because future contracts conducted under CBA rules will require it. Thus, contractors have to retain people who know how to maintain and operate the CAS compliant system, extract cost data for future proposals, and certify cost or pricing data. As one contractor put it:

If TINA was required on even one job, there would not be much savings. DoD would need to get rid of TINA on everything to reduce overhead costs.

Workload relief due to PBA was considered real and was welcomed, but it was also viewed as temporary unless DoD went completely to PBA for all its acquisitions, which everyone saw as unlikely. One company addressed the problem by establishing a G&A pool for commercial work (including DoD work awarded under commercial-like practices) that was separate from its G&A pool for DoD work. That way, the cost of proposal and reporting requirements unique to DoD contracts was borne only by the traditional, CBA military contracts. This company estimated that the G&A charges for CBA programs versus commercially administered DoD programs (under FAR Part 12 or programs with waivers) were about 16 percent more due to the burden of CBA-required cost and other reporting. This worked out to be a little less than 1 percent of the overall wrap rates charged, since G&A costs were about 6 percent of the total wrap rate. This company did not estimate the savings but thought the separation of pools had a positive impact on direct charges as well.

A second reason contractors gave for modest savings in overhead was that they collect costs internally anyway and use them to convince their management of the soundness of the business case before receiving approval to bid on a contract. Companies normally and routinely collect supplier quotes for materials and purchased parts/assemblies; direct labor estimates for engineering, manufacturing, test, quality, etc., for their workforce; and other costs for their own internal analysis. Although several contractors asserted that DoD often required more-detailed costs than they would normally gather for an internal business case, most agreed that cost collection and analysis would still occur even if DoD totally eliminated all requirements for any kind of cost data. In one case, in which the risk in the proposed bid strategy for development and production was viewed as high, the proposal decision had to be briefed to the corporate headquarters, using significant amounts of cost data to bolster the business case. In another case, a situation in which TINA certification had been waived, a contractor told us what happened during proposal preparation:

We followed our internal processes for gathering cost data, which were similar to what we would have done under TINA, except it was a little less rigorous and less formal of a format used for internal management and to justify the business case to corporate [headquarters]. But we had to provide a lot of data to justify a 6-year LTPA [long-term pricing agreement] to the corporate leadership.

Along the same lines, most contractors maintained that providing cost data to DoD for analysis was not a particularly onerous or time-consuming task, given that they already had DoD compliant cost accounting systems in place and routinely tracked costs in a DoD compliant format as a normal business practice. However, contractors almost always viewed data certification for TINA compliance as a significant and costly activity with no value added in terms of accuracy or price determination.

One DoD CO made the following point regarding a proposal received under a PBA program:

But, [Company X]’s proposals so far have used exactly the same format and cost data as when they had to supply the certified cost or pricing data. The proposals look exactly the same, using the same rationale and everything. The only difference is that they don’t have to certify the data. They claim that the systems they set up to operate in a TINA compliant environment are kept because they have other programs that are TINA compliant, and they still need the TINA compliant systems. A company can’t operate under two systems . . . but a clear implication is that the TINA compliant system is not as onerous and inefficient as people say.

Another DoD CO said:

The government tried to make the case with [Company Y] that they weren’t producing as much data [for a PBA contract], so there should be savings [to the government]. But [Company Y] said that they needed to generate the data for in-house use anyway and would have to run whatever cost data was provided to the government through their management. The TINA waiver helped them save copying costs, basically. [Company Y] was adamant during negotiations that there were no real savings from getting rid of TINA.

A contractor program management official, when commenting on the company’s process for submitting a bid on a PBA program, said:

We followed the normal proposal process; used the same estimating/pricing system, whether TINA or not. But [under PBA] we did NOT have to assemble a big book of paper with TINA-certified BOEs [bases of estimate] and send it in. However, this is not a huge cost. Most of the money is spent on getting supplier quotes, getting manufacturing estimates on what it takes to do the job [which is the same under PBA as CBA].

And a contractor cost and pricing official added:

The lack of TINA “sweeps” means less running around at the end of the proposal, but it is not that big of a deal compared to all the legwork required to develop numbers to present to corporate.

However, at least one senior contract pricing official said that totally eliminating TINA requirements from all contracts would result in some, albeit modest, proposal cost savings:

Maybe 1% of total costs for our whole facility is spent for TINA. TINA costs the most money on the front end of the job, where we spend our effort making sure we will comply with a post award audit. We could save 15 to 20% of the cost or pricing people on the front end of a proposal, which includes people who aren't specific to a particular proposal [not charging directly to the proposal], but 15 to 25% of my full time equivalents could be saved if TINA was not required of any job.

Thus, the views on the likelihood of achieving significant cost reductions by eliminating the requirement for cost or pricing data on proposals—even including the requirement for full TINA certification—were tepid at best.<sup>10</sup>

Yet another area of almost universal agreement (at least among contractors) was that preparation of CCDRs is not only costly but of no value to the contractor, the SPO, or the contracting function. CCDRs are reports on actual program costs that are taken at specified points in the development and production of a DoD system. Normally, CCDRs are submitted to DoD at two or three specific milestones during development and after each lot of production. CCDRs report the actual costs incurred by a program in a specified format.

Neither the contractors (which must collect the costs and put them in the required format) nor the SPO officials (who must process the CCDRs and presumably check them for accuracy before forwarding them to a central OSD collection office) saw any benefit to themselves in these reports. Both groups collected their own dedicated reports and data that they used to assess progress and the health of the program and saw little need for CCDRs. In addition, most

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<sup>10</sup> Some PBA advocates argue that many defense contractors are resistant to acquisition reform and resist PBA because it would shift more risk and responsibility onto them. This is why, it is claimed, contractors tend to minimize the overhead savings that would accrue from PBA, except possibly those associated with TINA requirements. According to some observers, most contractors dislike TINA because of the potential exposure to legal sanctions.



thought the effort to prepare the data was wasteful and that the reports were not effectively used. Thus, those charged with preparing the reports get little value from them and have no real interest in continuing them, especially against the backdrop of continuing pressure to reduce overhead costs.

A few contractors admitted candidly, however, that the actual cost to produce CCDRs was not significant. We were told about one program, for example, on which the first CCDR during SDD took two person-months of effort; the next CCDR took one person-month (presumably this is the learning curve at work). Another contractor claimed that the company used the same cost collection and management system to prepare Contractor Performance Reports (viewed as valuable because they give the current status of work progress on the contract) and CCDRs. The contractor sought to maintain only one database and use it for different applications as much as possible. For CCDRs, this contractor had to set up a crosswalk to use data collected internally, since the contractor's internal WBS differed from the CCDR WBS. However, the fact that the CCDR was a separate Contract Data Requirement List (CDRL) item and yet had not been separately priced indicates that it was not a major expense on the contract.

The requirement for CCDRs has been the subject of an ongoing debate for several years between program management personnel and the DoD cost estimation community, which uses the actual cost data from the CCDRs to develop models and methods for its cost estimates on future programs. Thus, it is a DoD policy dilemma, which is certainly not new, that those to whom the data are the least valuable—both in industry and DoD—are the ones who must develop and process them. But the cost data are needed later by other DoD personnel who must do a cost estimate on a future system or a variant to an existing system.<sup>11</sup>

In summary, whether real savings have been achieved through the use of PBA instead of CBA remains open to debate, but we found

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<sup>11</sup> Some DoD officials believe that contractors tend to oppose the requirement for CCDRs because the data in these reports may accurately reveal actual program profit margins.

no definitive evidence of quantifiable reductions in overhead rates on contracts.

### **Question 3: Has the DoD Acquisition Process Been Shortened?**

This question relates to the hypothesis that PBA should reduce the amount of time to get a weapon system on contract, with the assumption being that shorter is better. In Chapter Two, we noted that the nominal time for completing all actions for a generic CBA contract award was approximately six months. We found in our interviews that the opinions of both DoD and contractor personnel varied considerably on whether PBA shortened this time. Although metrics for program schedule slips during contract execution are available from the Selected Acquisition Reports prepared at least annually on all MDAPs, planned versus actual contract award schedules (the actions described in Chapter Two) were not normally maintained for very long after contract award.

Certain considerations related to the schedule issue surfaced during our interviews, the first of which was that the contract award process was not always planned to take place on the shortest time schedule. Some of the variables given as determining the planned award schedule were overall importance of the program and its priority to the operational users, whether the award involved source selection or was sole source, whether the contract was for development or production, type of contract,<sup>12</sup> and what the acquisition strategy and/or the program manager's requirements were. Thus, for example, a follow-on production award might be awarded at nearly the same time each year, allowing the contractor and DoD people to work their components of the award with some flexibility, interspersing work for one award with other work. In cases such as this, schedule savings due to PBA would be more important from a workload

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<sup>12</sup> One CO noted that the type of contract (cost plus or fixed price) had more impact on the schedule for source selection than did the type of contract award process (CBA or PBA).

standpoint (see question 4, below) than from a schedule savings perspective, since the award would be made on or near the target date regardless. In other cases, where initiating or continuing a program was of high priority, contract schedule savings could be crucial.<sup>13</sup> As one CO stated:

Note that schedule/time is an imperfect metric for the benefits of PBA. There are contracts that we award quickly because they are very important, and others where we don't bother finishing the paperwork and issuing the contract until we get through more important work.

Another CO observed:

If we compare apples to apples, price based acquisition to cost based acquisition from purely a cost review standpoint, in a fixed price competition with no cost data and just prices provided by contractors, reviewing that part of the proposal intuitively would take less time than a big cost plus competition with a lot of data. However, a lot of other factors drive the schedule in source selection. Fixed price situations are generally simpler to start with. The many dependent variables are too highly correlated to disaggregate cause and effect.

Yet many DoD COs noted that technical and other issues play a much more important role in schedule than does the requirement or lack thereof for cost data. One CO argued:

Getting certified or other types of cost data is not the schedule driver in a source selection. A lot of it is technological evaluation; this . . . [and] other issues are the schedule drivers. Is there a benefit from PBA on source selection schedule? No, there is no clear benefit *per se* from PBA. It is much more dependent on the Program Director, and other data requirements and selection criteria.

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<sup>13</sup> It should be noted that in very high priority situations, an undefinitized contracting action (UCA) can be awarded, in which case the contractor begins work on the project before a final price for the work is determined. Only a ceiling need be established; then, after the work has begun, a negotiated contract is put in place.

And another CO noted:

Remember, whatever the contractor sends in, the SPO must evaluate. Yet the SPO can just as easily limit data requirements on proposals for cost plus contracts, so this has nothing to do with PBA. Also, the SPO has to do some market research even on a cost plus contract.

Although interviewees generally felt that generating fewer data in a proposal (which would mean fewer data needing DoD evaluation) would have a positive influence on acquisition schedule, several DoD officials argued that their schedules could actually be extended if price information they needed to make a fair and reasonable assessment of a contractor's price were not readily available. One CO's comments were typical:

Without TINA [certified cost or pricing data], we don't have the data to analyze; so presumably it should save time, but actually we spend so much time justifying a fair and reasonable price that this took probably the same amount of time as we would have spent looking at TINA cost data.

A group of contracting people at a product center argued vociferously that there was no difference in the overall time to get on contract between PBA and CBA. They argued that they still had to go through the same processes regardless of approach: RFP, proposal, negotiations, contract modifications, etc. Their general feeling was that under PBA or other, more commercial approaches, the contractor spent less time preparing a proposal because it had to provide only a limited basis of estimate and summary level cost information. This, they maintained, meant that DoD personnel had to fill the gap with their own, more-extensive market and other types of research to reach a fair and reasonable determination. This extra work on the part of DoD, they argued, offset the contractor's possible schedule savings.

Other interviewees, however, insisted that there were indeed schedule savings—at least for simple PBA-like follow-on production contracts. This contrary view, expressed by a price analyst on a follow-on production buy, serves as an example:

It [PBA] did save time for the SPO. I was able to put together my position and briefing charts in just two weeks, instead of six weeks [under CBA]. I didn't have to do extensive fact finding, nor any plant visit, because it was a similar buy. I didn't need any DCAA or DCMA assistance, which we do normally need. The government didn't lay anybody off, we still had the same number of pricers, but we were able to look more carefully at another case that might have been less well analyzed. . . . The SPO had less work, too. Normally their engineers would have had to provide a technical evaluation of the proposal—doing less work probably helped them. The SPO contracting officer and his/her management still has to sign off on what we do. In the prior year they had purchased in the traditional cost-based way and it had taken the exact same amount of time, so they didn't save schedule. They weren't grinding through the numbers, however, so they could work other cases during this time.

But one other analyst, who worked on a FAR Part 12 program, insisted that the time to get on contract was 30 to 40 percent faster on a PBA program than when using a CBA approach. He claimed that the annual production buy that in the past had normally taken about nine months was taking on average four to six months under FAR Part 12.

Thus, the majority of DoD officials stuck to the argument that the evaluation of a proposal's cost portion is not the schedule driver in a source selection. Even several contractors agreed that the cost portion (Section L) of most proposals does not greatly affect schedule and workload, except when TINA certification is involved.

One area of general agreement, especially among contractors, was that the requirement for *certified* cost or pricing data—that is, TINA data—adds additional time to the contracting process. The consensus was that the requirement for TINA data consumed about 30 extra days of effort, with little value added to the final price. Although other contracting actions can proceed while the TINA

sweeps<sup>14</sup> are made, the 30-day period just before contract award was seen as mostly “dead” time in the schedule.

Despite the fact that contractors in some cases were more than willing to share their cost data with DoD, the addition of the TINA certification requirement was seen as a major complication to the cost data process. As pointed out previously, contractors already gather data to convince their management of the soundness of the business case for any given program, but the level of detail for internal decisionmaking is usually nowhere near the level of detail required by TINA certification. In addition, once the cost data are gathered to make the business case in a non-TINA situation, a sweep to update the data usually is not done, particularly in a period of generally stable prices. Even DoD COs confirmed that contractors typically expend considerable effort and time checking their final certified cost data to avoid defective-pricing accusations. Almost all interviewees agreed that the additional risks and criminal exposure raised by TINA are a significant and legitimate contractor concern. Sometimes program starts are delayed because contractors make extraordinary efforts to ensure that no errors, no matter how trivial, have crept into their estimates.

Thus, DoD did not see additional cost to itself because of TINA as a significant problem, but it did see delay in finalizing contracts as an issue. One CO noted that after a “handshake agreement” (agreement on costs, work scope, hours, etc.) involving an Alpha contracting process (more on this type of contract is provided below), the contractor still typically took six weeks or more to provide certified cost data. Such delays were often considered an unnecessary impediment to quick launch of a high-priority project.

One aspect of TINA implementation that is seen as particularly disruptive is the requirement that sole source suppliers and subcon-

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<sup>14</sup> As stated earlier, sweeps of the contractor’s cost accounting system consist of comparing the costs of labor and materials in a proposal to the actual costs carried in the contractor’s cost accounting system as of the date of the proposal. If the proposal cost of an item is higher than the actual cost as of the proposal date and has a marked influence on the negotiated price of the contract, the contractor can be charged with defective pricing, which can involve significant financial or criminal penalties.

tractors whose role in the overall contract exceeds \$550,000 must also certify their costs to the prime contractor, which in turn must certify all costs to the government. Interviewees estimated that for one program that was using a PBA approach, conversion to CBA with TINA certification would require that certified data be obtained from 20 contractors, some of which sold parts for as little as \$15 each. Due to the volume involved in the buy, suppliers of what are relatively inexpensive parts would still have to go through the certification process. Some prime contractors noted that TINA significantly slows down the internal company subcontracting process with vendors because the lower-tier suppliers must go through the certification process. Rather than submitting a proposal with a previously agreed-upon price between them and their supplier, prime contractors had to wait for TINA data from the supplier before submitting their proposal.

The rationale for requiring certified cost data is, of course, that they serve as a safeguard against “defective pricing,” or price gouging.<sup>15</sup> It is interesting to note, however, that based on the detailed data we acquired from one major product center, the instances of defective pricing have been declining for some time and make up only a very small percentage of total contracts. For example, the number of defective pricing cases at one product center in FY 2003 dropped to one-third of the cases experienced in FY 1996. Of the total dollars involved in these cases (~\$150 million), the recovery rate varied between 1 and 4 percent. Overall, defective pricing was involved in about 1 percent of the total R&D and procurement dollars involved. To attribute this drop to less business, less post-award auditing, or greater accuracy on the part of contractors would be pure speculation. In addition, it is impossible to determine the deterrent value of TINA, even if TINA is not required on every program. And there is no way to know what the effect of entirely eliminating TINA would be.

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<sup>15</sup> Simply put, defective pricing is inaccurate pricing, usually with the implication that the pricing is unreasonably inflated.

Another area where we found general consensus that PBA saved schedule time was contracts whose production lot prices were tied to an original competition for a development contract award for SDD.<sup>16</sup> In these instances, follow-on production prices were a required component of the SDD proposal and were submitted during a competition with several companies. Thus, because of the competition, the CO could establish a fair and reasonable determination for both development *and* production price.

The process for actually pricing these follow-on awards took many forms, including long-term pricing agreements, price commitment curves, tables with quantities and prices for annual buys, etc. But no matter what form they took, both DoD and contractor personnel in many programs noted the ease with which the follow-on buys could be executed, with contracting actions often taking only a few days instead of the months usually needed for an annual, CBA award process. In one program, all the contractor had to do was submit a letter to the SPO validating that its previous price for the lot was still valid and could serve as the basis for the contract award. In another, the SPO merely had to notify the contractor of the quantities desired using the quantity/price table. We should note that these approaches were generally used for lower dollar value units with higher production quantities (such as munitions) rather than for higher value, lower quantity programs (such as aircraft).

Finally, it should be noted that many interviewees argued that other reforms often used in conjunction with PBA might contribute more to saving time during the contracting process than PBA does. One of these, Alpha Contracting, is an integrative approach used by all the AFMC product centers (although each one uses a different name for it).<sup>17,18</sup> With Alpha Contracting, DoD and the contractor

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<sup>16</sup> For major exceptions to this consensus, see Chapters Four and Five.

<sup>17</sup> According to the NAVAIR Alpha Acquisition Overview presented on the Defense Acquisition University's Acquisition Community Connection Web site ([http://acc.dau.mil/simplify/ev.php?ID=5944\\_201&ID2=DO\\_TOPIC](http://acc.dau.mil/simplify/ev.php?ID=5944_201&ID2=DO_TOPIC)): "Alpha Acquisition is a concurrent versus serial approach which involves the integration of the Program/Project/Acquisition Manager (PM/AM), the Contracting Officer, the Contractor, the Defense Contract Audit Agency (DCAA), the Defense Contract Management Command (DCMC), various field



form integrated product teams that review all aspects of a proposed program and the workload involved (technical, schedule, cost, etc.) to come to an agreement on the project's scope and costs. Many of the interviewees credited Alpha, which is normally used with a sole-source award, with helping to shorten the time from RFP release to contract definitization, a period that on previous contracts had sometimes taken a year. It also eliminates the need for a pricing review, and because the DCMA and DCAA reports are provided directly to the negotiator, they no longer need to be consolidated. After the Alpha "handshake," the contractor may have to submit certified cost or pricing data with the final proposal if a TINA waiver has not been approved. Nearly all interviewees agreed that the Alpha process was a major time saver, but that it required DoD involvement earlier in the process since it included major pre-proposal activities. As an example of the schedule savings, one DoD analyst claimed:

As to schedule savings, our program went from 18 months for idea to contract to about 10 months using One Pass [ESC's name for Alpha Contracting]. There was time saved on fact finding and negotiations, because the SPO was able to go over the contractor's cost data.

In summary, just as was true for many other metrics we used to judge the effect of PBA, a clear-cut, universal answer with regard to schedule savings does not emerge. Undoubtedly, proper application of PBA in the right circumstances may lead to faster contract awards, but whether these schedule savings are significant in the larger scheme of an entire contract award process is not easy to determine. In addition, schedule savings may not lead to earlier contract awards, but

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activities and sometimes the Navy 'Price Fighters' organization into a cohesive team. The common goal is to acquire goods and/or services for the Government in an expedited manner at a fair and reasonable price. Alpha Acquisition is a framework for expediting the acquisition process. The purpose is to eliminate any unnecessary processes and reviews, and to streamline and conduct in parallel the required ones. Nevertheless, the same issues addressed in standard procurements are addressed in Alpha Acquisition, the same questions asked, and the same support provided. However, it is all done much more quickly and started earlier in the process."

<sup>18</sup> Alpha Contracting is called "One Pass" at ESC and "Review, Discuss, Concur" at AAC.

they may free up time for analysts to work on other issues or programs. There is one area, however, in which substantial schedule savings have occurred under PBA: the coupling of pre-priced production lots with initial award of a development contract, such as in the case of JDAM and JASSM (discussed in depth in Chapters Four and Five). In these programs, the paperwork processing for follow-on production lots has been streamlined because prices were established earlier under the competitive downselect for development.

#### **Question 4: Has the DoD Acquisition Workload Been Reduced?**

The real issue of interest behind this question is whether COs, with the assistance of cost and price analysts, can make an effective determination of a fair and reasonable price for a contract under PBA and do so with less work. Most DoD and industry officials we interviewed made an important distinction between schedule and workload. Schedule can be determined by numerous factors other than workload (such as program priority), as noted in the previous section. In principle, workload should be directly related to cost (whether or not it affects schedule) and therefore could be a more useful metric of the potential benefits of PBA. In theory, with a reduced workload, one would need fewer people on the payroll, whether they were DoD personnel or contractor personnel. Based on the discussion in Chapter Two, one would expect contractor workload to be reduced under PBA because of the elimination of (or significant reduction in the amount of) the cost or pricing data that must be provided to DoD, the eliminated fact-finding trips to contractor facilities, the eliminated post-award audits, the eliminated cost reporting, the simplified award of follow-on production contracts, and the reduced need to justify prices paid to suppliers by primes, and so forth.

In theory, under PBA, companies might be expected to emulate commercial acquisition practices that are, *ipso facto*, assumed to be more efficient than the seemingly more bureaucratic and ponderous

practices imposed by DoD. Within DoD, as we pointed out in Chapter Two, PBA should lead to reductions in workload through the reduction of data analysis, audits, etc.

Under CBA, a contractor normally has to produce significant amounts of cost or pricing data, which DoD cost and price analysts must then evaluate. Under PBA, a contractor produces minimal amounts of cost or pricing data, and the analysts must figure out ways to determine whether the prices being offered are “fair and reasonable.” Thus, there is somewhat of a role change for the DoD analysts under PBA in that they go from primarily evaluating what a contractor provides to them, to evaluating whatever historical cost data from analogous past programs they can find, as well as market prices or prices DoD has paid for similar items. As one price analyst noted: “In essence, PBA shifts the work burden from the contractors to the DoD price analysts, who have to somehow determine price.”

The most common method selected by DoD cost and price analysts to evaluate contractor prices on PBA proposals is to use old cost or pricing data from analogous programs. However, many DoD experts expressed concerns that as more and more programs use a PBA approach, the available sources of past cost data will age and diminish. Not only will the submission of contractor cost data diminish in source selections or sole-source awards with the greater use of PBA, but, because PBA eliminates post-award cost reporting, actual development and/or production cost data necessary for future cost estimates of similar systems will become increasingly scarce. And because DoD MDAP systems are often unique to the military, few DoD interviewees saw the widespread use of available<sup>19</sup> commercial pricing information as a viable solution to this problem.

For truly commercial or commercial-like systems, the DoD analysts and COs generally felt comfortable making determinations with available pricing data, although many felt adjustments were nec-

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<sup>19</sup> By *available* we mean actual prices paid that are accessible through sources open to almost anyone. The advertised prices for commercial aircraft or automobiles, for example, are often much different than the actual price paid after negotiations. Therefore, only the buyer and seller may know the real price paid, as well as the terms and conditions of the sale.

essary because of unique terms and conditions. For example, prices paid for aircraft parts are often available, but airlines normally purchase in small quantities (and indeed may purchase parts one at a time for a particular aircraft) and require rapid delivery to any location in the world. DoD, in contrast, purchases much larger quantities for wartime and peacetime stocks and accepts a longer lead time, so lower prices should be expected. Many interviewees felt that if DoD implements PBA more widely, it should maintain for use by all DoD cost and price analysts, at a minimum, a government-access-only central database of system/product descriptions, contract terms, and the prices paid by DoD organizations.

Some said they felt they were caught in a difficult position between the senior DoD decisionmakers' desire to implement PBA on a wider scale and the statutory and regulatory requirements for determining whether a price being offered is "fair and reasonable." This responsibility sometimes results in DoD asking for more data than would be considered normal from a pure PBA viewpoint. One senior CO noted:

We are still getting a substantial amount of other than cost or pricing data, and are still doing an in-depth look at that information, so I suspect we are not saving a lot of time or money. There are programs where we are doing price analysis, and that does save a tremendous amount of time and money for both industry and government. GSA [General Services Administration] procurements are in this category. However, even in competitions we are getting quite a bit of data because they are cost plus contracts. We want to ensure the contractors understand what they're getting into (cost realism). Do they understand the program? Much of what we buy is for development contracts, so we look for price realism. Even if we have a competition, we want to reduce the risks using price realism. We don't want contractors to low ball up front so they have to overcharge in the out years. These are FAR Part 15 contracts. The only real difference (using PBA) is that you are not requiring TINA certified data.

And a cost analyst noted:

Cost analysts can be very threatened by PBA. PBA takes away their learning curves and their data, and they have little role left, except to say, 'Is the value of this [product] in the marketplace reasonable relative to the value of similar weapons?' Unfortunately, it's almost impossible to get useful data from other PBA programs.

A senior CO summed it up this way:

If the DoD can execute a contract under PBA, it takes much less manpower by avoiding evaluation of reams of data, *IF* a fair and reasonable price can be determined. The results may not be 'better,' but we just have to be fair and reasonable, without reams of data, and fulfill our fiduciary responsibility, i.e. creating a good business decision for the U.S. government without excess non-value-added work.

Again, however, the central issue is how can DoD determine whether the price is fair and reasonable without a true commercial market and without competition? One situation that DoD analysts routinely identified as an area of concern is that of properly analyzing the costs to modify (or upgrade) a system that originally was awarded a PBA-type contract under competition (with few cost data) and now requires modification because of technological advances or operational requirements changes.<sup>20</sup> So far, most of these modifications have been handled as a cost-plus portion of the contract, with the contractor providing cost data (since the award was sole source), and the original PBA contract addressing the baseline content. In this way, the price of the new work or equipment could be established, but, since the replaced work or equipment had never been separately analyzed, its baseline cost was often only an educated guess, unless the contractor was willing to open the books on all costs associated with the system. One program manager had this to say:

We received a proposal for a \$6 million modification that was one single page. The pricing shop tries to help the CO and his

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<sup>20</sup> Chapters Four and Five discuss this issue further.

folks, but the only information the government has is what the contractor provides, so we are forced to trust the contractor. Proposals are sometimes disconnected—our contractor was quoted as saying they didn't know what it really cost. My frustration is all the change proposals—tens of millions of dollars of change proposals—and there is no competition. We can look at the details of numbers of people who are actually there [to work on the program] to check whether hours are in the ballpark, but the contractor doesn't have to use the hours, and, since it's Firm Fixed Price, they can convert these hours into profit without the government's knowledge. The contracts are basically take it or leave it.

Another issue that surfaced had to do with the fact that all of the acquisition reform initiatives were implemented against a backdrop of general reductions in the Air Force acquisition workforce during the 1990s. Some saw PBA as an effective tool for reducing workload so that functional responsibilities could be continued with fewer people. Others were not as positive, arguing that PBA was a necessity to justify the simple fact that the staff was no longer adequate to conduct a full analysis of pricing and cost data, or to conduct market research. One senior cost analyst commented as follows:

It's hard to say if PBA saves workload when you don't have enough folks to do the minimum core work! When we send people to source selections, their old jobs become extra duties. In terms of cost or pricing workload, the technical evaluation normally outweighs cost evaluation anyway in terms of schedule. The main thing shortening the process is too much work with too few people.

And a senior CO said:

Contracting offices are tending to use FAR Part 12 [commercial-like contracting] because it's quicker and faster, and because they have fewer workers to get the job done.

In summary, despite hearing many diverse views on the subject, we came away with the following conclusion about whether PBA

implementation brings about workload reductions: If used in the proper circumstances, PBA should save DoD analysts and COs at least some workload. There was clear consensus that workload is reduced when TINA requirements are eliminated on an individual program. There was also a widespread belief that eliminating the requirement for *all* cost data of any type would *not* save workload and, furthermore, would raise major difficulties for DoD officials attempting to make a determination of fair and reasonable pricing in sole-source awards.

## Concluding Observations

Based on our extensive interviews with DoD and industry experts, we arrived at the following conclusions about the available quantifiable evidence for overhead or contract management savings from PBA in cost, schedule, and workload:

- Use of PBA in the right circumstances can be a positive influence for both DoD and contractors involved in a particular program, but results vary on a case-by-case basis.
- While most officials believed at least some overhead and contract management savings accrue from PBA, little or no quantifiable evidence is available to back up the claim.
- Potential overhead and contract management savings from the use of PBA for DoD MDAPs have probably been overstated and are likely to be modest.
- There is some quantifiable evidence that PBA can lead to modest reductions in contractor overhead rates, but these reductions are very small compared with overall contract costs. To fully realize the potential of such reductions, PBA must be applied across the board to all contracts, which is extremely unlikely to happen (and which we would not endorse).
- Although PBA probably shortens some aspects of the contracting and oversight process, we found no clear quantifiable evidence that PBA is decisive in shortening acquisition schedules.

The reason why PBA does not play a decisive role is largely that PBA has no effect on a multitude of factors that are most decisive in influencing acquisition schedules.

- DoD and contractor workload can be reduced on certain types of programs with LTPAs by eliminating the requirement for TINA certified cost data and using PBA. The scale of these workload reductions is probably small and is difficult to quantify.



## A Taxonomy and Review of PBA Case Studies

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This chapter's aim is to test and expand on the issues and findings discussed in Chapters Two and Three by discussing and summarizing our analysis of a wide spectrum of PBA-like case studies. We examine, in total, more than 30 DoD major weapon systems that used PBA on at least one contract (Table 1.4, in Chapter One, lists the programs).<sup>1</sup>

First, we categorize the programs into a taxonomy based on the categories and rationale used to determine the applicability of PBA under recent and existing DoD guidance and regulations, as well as statutory requirements. In other words, these are the situations under which PBA-like programs have taken place in the recent past in the "real world." We then discuss how each of the systems fits into one of three major categories. In the course of discussing many of the cases, we comment on issues discussed in a more abstract manner in Chapters Two and Three. In addition, we review several other issues raised by our initial seven key study questions, as discussed at the end of Chapter One. More specifically, we focus on issues raised by questions 5 and 6 regarding PBA and its claimed relationship to enhanced competition and greater CMI. A more detailed discussion of many of these issues follows in Chapter Five.

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<sup>1</sup> Not all programs that we examined in the course of this research are discussed here, and what Table 4.1 provides is an illustrative sample of programs examined, not a full listing.

## Taxonomy of Programs

As discussed previously, not all PBA examples follow the same pattern. However, we felt there might be consistent ways in which PBA has been applied that could reveal suitable ways in which it can be used, as well as potential pitfalls. To capture the range and spectrum of PBA experiences, we developed a taxonomy that describes the different ways that PBA has been incorporated into acquisition programs. This taxonomy is explained and applied here to illustrate DoD's range of past and current uses of PBA.

What we found in our analysis of PBA-like programs was that the recent statutory and regulatory environment allowed DoD only three major rationales for not requiring the submission of certified cost or pricing data. As briefly explained in Chapter One, only some of the large military-unique MDAPs that would normally fall under the full cost reporting provisions of FAR Part 15 qualify for relief under the existing statutory and regulatory regime. Virtually all examples of PBA-like major military-unique MDAPs currently implemented by DoD can be placed in one of these three categories, which are as follows:

1. Historical cost data exist (FAR Part 15 waiver). Enough data exist to accurately predict the price of the work being negotiated and determine a fair and reasonable price. These data can be from the same program or a similar program for which DoD has actual costs. The requirement for certified cost or pricing data is waived to save money and workload for both DoD and the contractor.
2. Competition (FAR Part 15). Multiple contractors are competing to develop and build the same system. It is assumed that market forces operate to create a fair and reasonable price, so certified cost or pricing data are not required because the basis for determining a fair and reasonable price arises from competition, not the accuracy of the cost estimating data.

3. Commercial determination (FAR Part 12). The system has been determined to be commercial in nature.<sup>2</sup> Certified cost or pricing data are not required because the prices of commercial products are considered available to DoD for comparison and because the marketplace has a continuous competition that, by its nature, is assumed to result in a fair and reasonable price.

We developed subcategories of each of these three major categories to further distinguish and explain how DoD applies different forms and degrees of PBA-like approaches. Table 4.1 shows these three major categories and the subcategories; it also presents examples of each type of category and subcategory. When the taxonomy presented in this table is read from top to bottom, it more or less represents a continuum along a spectrum from least PBA-like to most PBA-like characteristics. In other words, the subcategories near the top of the table represent the least radical departure from conventional CBA approaches, whereas those near the bottom represent increasing movement toward the PBA side of the continuum.<sup>3</sup>

In the remainder of this chapter, we discuss each of these categories and rationales in more detail and describe the distinguishing attributes of the different types of acquisition programs that fit into the categories. We also offer very brief case study overviews to illustrate how these rationales are used in practice. From this discussion we attempt to glean lessons learned from the now fairly extensive DoD experience in implementing a variety of PBA approaches under a wide range of different circumstances. In the course of this discussion, particularly with respect to the second and third major categories, we comment at length on many of the issues raised in our original key questions 5 and 6 regarding competition and CMI, and possible benefits that have been claimed to accrue. These later issues are discussed in greater length and on a more theoretical level in Chapter Five.

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<sup>2</sup> See further discussion in Chapter Five.

<sup>3</sup> See Chapter One for a discussion of the PBA continuum as laid out in the PBA Study Group Report.

**Table 4.1**  
**RAND Taxonomy of PBA-Like Case Studies: A Continuum from CBA to PBA**

PBA Categories and Rationale	PBA Subcategory and Characteristics	PBA Examples
Historical cost data (FAR Part 15 Waiver)	<ul style="list-style-type: none"> <li>• Extensive history of certified cost data</li> <li>• Production add-ons</li> </ul>	F-16, Predator, B-1B TDS, LANTIRN, LITENING
	<ul style="list-style-type: none"> <li>• Extensive uncertified cost data</li> <li>• Joint Price Model (JPM), Joint Cost Model (JCM): long-term pricing agreement (LTPA)</li> </ul>	C-17 Multi-Year Procurement (MYP) II, AMRAMM lots 16–21
Competition (FAR Part 15)	<ul style="list-style-type: none"> <li>• Dual-sourced production</li> <li>• Extensive uncertified or certified cost data</li> </ul>	AMRAAM lots 1–8 F100, F110 engines
	<ul style="list-style-type: none"> <li>• Indirect competition for production lot</li> <li>• Limited cost data</li> </ul>	F-16 Block 50 Foreign Military Sales (FMS) (Israel, Greece, Norway)
	<ul style="list-style-type: none"> <li>• Initial lot FFP + long-term production price commitment curves (PPCCs) from SDD competition, average unit procurement price requirement (AUPPR)</li> <li>• Sole-source production</li> <li>• Carrots and sticks</li> </ul>	JDAM, WCMD, JASSM
Commercial determination (FAR Part 12)	<ul style="list-style-type: none"> <li>• No cost data; market price analysis</li> <li>• Items developed for commercial market</li> </ul>	C-40
	<ul style="list-style-type: none"> <li>• Historical certified cost data</li> <li>• Military item designated commercial</li> <li>• Commercial off-the-shelf nondevelopmental item (COTS NDI), commercial variants</li> </ul>	JPATS T-6A lots 9+, C-17 MYP II (not implemented)
	<ul style="list-style-type: none"> <li>• Limited historical cost data</li> <li>• Military item, contractor-funded R&amp;D</li> <li>• Offered commercially</li> </ul>	C-130J, T-38 PMP

## Historical Cost Data (FAR Part 15 Waiver)

Historical cost data are used as a justification for PBA when the argument can be made that DoD has enough information to determine a fair and reasonable price for what is being purchased, especially when the argument can be made that collection of certified data will add little or nothing to DoD's understanding of program costs. The head of the contracting authority (HCA) grants a waiver based on a determination that "price can be determined to be fair and reasonable without submission of cost or pricing data" according to FAR Part 15.403-1(c)(4). This can have a couple of different shadings. One is that DoD has recent TINA data from the program and a good understanding of costs, a situation that generally occurs in follow-on production lots where certified cost or pricing data were provided on previous production lots. Another is that there are very substantial but uncertified amounts of cost data or, sometimes, actual cost data resulting from a similar program.

This straightforward application of TINA waivers has resulted in claims of cost savings arising from production gaps being avoided (because of the more rapid contracting process for follow-on buys) or from being able to make Economic Order Quantity (EOQ) purchases.<sup>4</sup> This relatively conservative use of PBA enjoys strong support from both industry and DoD officials. Both sides of the negotiation table agree that it can reduce workload and schedule. There is some concern, however, that the FY 2003 National Defense Authorization Act provision on TINA waivers may effectively eliminate the use of this approach.<sup>5</sup>

### History of Certified Cost Data

The first subcategory in which historical cost data are seen as offering a reasonable substitute for certified cost or pricing data and FAR Part

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<sup>4</sup> EOQ purchases are those in which the prime contractor orders items from vendors in quantities large enough that vendors are willing, due to economies of scale, to offer discounted prices.

<sup>5</sup> See Chapter Five for further discussion of potential impediments caused by this legislation.

15 waivers have typically been used consists of cases in which recent certified data are deemed to be adequate for determining a fair and reasonable price for future procurement lots. These situations might arise where there is a plethora of certified cost or pricing data due to a long program history (e.g., the F-16 program) or where there is a production add-on amendment to an existing CBA purchase contract that included certified cost or pricing data. In the latter case, a TINA waiver may be granted because a quick contract award is needed to take advantage of EOQ purchases from subcontractors.

**Extensive History of Certified Cost Data.** The F-16, with its extensive program history that includes a well-documented and well-understood cost structure and cost improvement curves, is an excellent example of this type of case. The F-16 began as the Lightweight Fighter Program in 1971. In 1976, General Dynamics (GD) in Fort Worth, Texas, was selected as the prime contractor. (Lockheed Martin later acquired the GD Fort Worth division and is now responsible for F-16 production.) Since the original development program, a series of upgraded variants have made the fighter increasingly capable. According to Lockheed Martin,<sup>6</sup> the U.S. Air Force has bought over 2,200 of the aircraft, and 20 other nations have purchased in excess of 1,800 additional aircraft. This fighter is still being manufactured today, although foreign military sales (FMS) now account for most of the production.

The large number of F-16s produced means that great quantities of cost data have been collected on this aircraft. Although the aircraft has changed considerably through numerous upgrades and through many foreign variants, the long production of the basic airframe-engine combination means that DoD COs and other acquisition officials should be able to predict the costs of the new aircraft fairly accurately. (The exception to this is modifications to the basic aircraft involving new developmental items, for which it is more difficult to predict costs.)

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<sup>6</sup> See [www.lockheedmartin.com/factsheets/product16.html](http://www.lockheedmartin.com/factsheets/product16.html).

This history has made the F-16 a candidate for one of the applications of PBA in which there is a sufficient history of certified cost data to justify a fair and reasonable price determination. This extensive history of F-16 certified cost or pricing data has been used as a justification for TINA waivers for several production lots. For example, since the 1997 buy was TINA compliant and entailed submission of certified cost or pricing data, the F-16 SPO asked for and received TINA waivers in 1998 (for two aircraft) and 1999 (one aircraft). The SPO then asked for certified cost or pricing data the following year, choosing not to continue extrapolating from data it viewed as becoming increasingly out of date.

In FY 2000, ten Block 50 F-16Cs were procured. DoD asked for and received certified cost or pricing data for this buy, with the expectation of receiving TINA waivers for purchases of additional production lots over the next several years. In FY 2001, when the Air Force bought four more aircraft, it asked for and received a TINA waiver and used the previous unit price curve with an additional factor for inflation. The TINA waiver was based on the grounds of having a sufficient amount of reasonable data. Proposal costs for the FY 2000 buy were about 0.6 percent of the total value of the buy (about average, per Chapter Two's Table 2.1). Presumably, most of that amount was saved the next year when the TINA waiver was used. DoD and the contractor also saved the time and effort inherent in the TINA data collection and review process. Note, however, that what happened here confirms the findings from our interviewees (Chapter Three) that while contracting process savings from PBA are real, their scale is rather modest.

The F-16 SPO considers this form of PBA a useful tool that is very reasonable to use in what it calls cookie-cutter situations—programs such as the F-16, for which the SPO does not expect any real cost surprises at this point. The F-16 SPO did express concern, however, that the new congressional guidance mentioned above may eliminate this use of TINA waivers. The SPO sees any major constraint on the future use of TINA waivers in these situations as money being spent unnecessarily on proposal preparation and as DoD effort being unnecessarily expended on proposal review and the

attendant tasks required to collect and review certified cost or pricing data.

The Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) program represents another case in which DoD successfully waived TINA data requirements because of a long history of certified cost or pricing data. LANTIRN pods are subsystems that improve an aircraft's navigation and operational capabilities at night and in all weather (thereby allowing attack aircraft to fly at low altitudes at night) and its targeting abilities to increase offensive effectiveness.

The Air Force has been buying LANTIRN pods from Martin Marietta and its successor company, Lockheed Martin, since 1984. In 1999, the Air Force asked for and received a TINA waiver and priced the pods based on previously negotiated prices derived from certified cost or pricing data. Later pods were priced by applying inflation indices to the previous price. The 1999 buy also had varied quantity terms, for which DoD and the contractor developed pricing curves to reflect prices at the different quantities that might be purchased in the future. Only three months went by from the time DoD received the proposal to the end of negotiations. In this case, the contractor did not offer tradeoffs or cost reductions in return for not having to provide TINA data. The use of PBA did save some DoD effort, however, since the SPO team needed for the negotiations was smaller than it would have been otherwise. Nonetheless, the interviewees who described this case made it clear that schedule and time are each an imperfect metric for PBA benefits. They argued that other factors, such as program urgency, are far more important.

### **Production Add-Ons**

In this type of case, a history of certified cost data plays a role when DoD wants to obtain production add-ons to previously negotiated lots. Here, DoD and the contractor generally have an agreement for delivery of a certain number of items based on costs negotiated with certified cost or pricing data, and DoD then decides to add more items to this production lot buy using a modification to the basic contracting instrument.



An example here is the acquisition strategy that was used for the RQ-1 Predator, which is built by General Atomics in San Diego. The Predator is an unmanned aerial vehicle (UAV) designed for reconnaissance, surveillance, and target acquisition; it has also been used to fire a Hellfire missile, in Yemen in November 2002 to kill suspected Al Qaeda terrorists.

As of November 1999, nearly 40 Predators had been produced for non-Air Force U.S. government clients, including the Navy. In August of that year, the Air Force awarded a Fixed Price Incentive Fee (FPIF) contract to General Atomics for a small production lot of Predators; the Air Force originally planned to buy several aircraft, one ground control station, and several de-ice kits. A contract option included one more ground control station, several more de-ice kits, and a Variation in Quantity (VIQ) contract for a variable range of new aircraft. This option had to be exercised by the middle of December 1999 to avoid a production break at the prime contractor.

The original buy, which was TINA compliant, included a review of 80 percent of the component prices and their cost improvement curves. During this process, some vendors pointed out the benefits of avoiding a break in production, stating that even small additional purchases would provide major economies of scale that would result in significantly lower prices. Three months after negotiating the first baseline contract, the Air Force went back to the prime contractor and ordered a small number of additional aircraft, which resulted in a new, lower price for the entire production lot.

The Air Force received a TINA waiver for negotiating a price for the add-on units to the original contract. One point of interest here is that the prime contractor had planned to do a CBA proposal for the add-ons and expressed concerns that it would be accepting greater liability for cost overruns under PBA. The price benefits were so significant, however, that both the Air Force and the contractor worked out a mutually acceptable PBA agreement for the add-on contract modification. The SPO estimated General Atomics's proposal preparation savings to be in the six-figure range, and it estimated that DoD (SPO, DCAA, and DCMA) saved approximately 2,100 hours of effort by not having to evaluate a fully TINA compliant proposal.

There were further and more significant savings from the EOQs inherent in the additional buy, but these are not ascribable to PBA and would have occurred even under a CBA contract *if* the CBA contracting process could have been completed in a sufficiently timely manner.<sup>7</sup>

Another example of this type of case is the Towed Decoy System (TDS), a countermeasure system that helps protect B-1B bombers against radio frequency (RF) threats. The original buy was for a small number of TDSs, with options for two additional units. Boeing had submitted certified cost or pricing data for the contract, which was awarded in May 1998.

The B-1B SPO then received enough additional funding to nearly double the buy. The original contract covered installation of the systems during programmed depot maintenance (PDM) of the B-1B planned for FY 2002. The SPO planned to include the additional units in the existing FFP contract with Boeing, which would also include an option for additional TDSs. Based on the estimated value of exercising the add-on option, Boeing and two of its subcontractors (Collins and Southern California Braid) would be required to submit certified cost or pricing data.

The SPO calculated that there would be savings if the contract could be completed quickly, before the end of 2000, which would necessitate a TINA waiver. The savings envisioned included a unit price savings of about 15 percent due to lower prices through greater economies of scale, and savings in the six-figure range for reduced proposal preparation costs. These contract process savings amounted to about 3 to 4 percent of the contract value. The majority of the savings, however, were to come from avoiding the production break rather than from any benefits stemming directly from the PBA-associated reduction of regulation. However, PBA did enable the Air Force to issue the contract more quickly, thus helping the Air Force to avoid the production break and to enjoy the price savings. Air

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<sup>7</sup> Savings on the Predator program due to TINA waivers are documented in U.S. General Accounting Office, 2002.

Force acquisition leadership approved the TINA waiver for this program in October 2000.

We examined several other production add-ons in which COs claimed that PBA made lower prices possible by reducing the time it took to negotiate unanticipated last-minute add-on contracts and thus permitting DoD to take advantage of the price benefits of greater economies of scale.

Yet while the savings from using TINA waivers where there are recent certified pricing data are not insignificant, they represent only a very small proportion of the Air Force procurement budget. Under this PBA approach, contractors still have to maintain a full contracting and cost staff to create the certified data and will have to continue to do so unless the requirement for such data is completely eliminated on all programs. DoD workers can focus any of their freed-up time on other projects, but the use of PBA has not led to significant reductions in the cost estimating or contracting staffs (although these workforces have experienced large reductions because of other initiatives). Moreover, cases in which a small last-minute add-on to an existing production contract significantly lowers unit costs by putting the buy on a new plateau of economic production quantities are relatively rare.

It appears that in these cases, collection of the TINA data provided little benefit to DoD. But PBA did serve as a tool that added flexibility to the procurement process, reduced DoD workload, promoted modest cost savings, and in some rare instances helped DoD avoid production breaks and reap significant price savings due to economic production quantities.

### **Extensive Uncertified Cost Data**

Another major subcategory in which historical cost data can support the use of PBA consists of cases where there has been a long program history with clearly understood costs and a very predictable price improvement curve that do not necessarily entail the collection of certified cost or pricing data. Here, the contractor or DoD can make the argument that it should have a very good understanding of what the costs will be in future production lots, and that submission of cer-

tified cost or pricing data will add little or nothing to the program other than extra proposal costs or unnecessary DoD effort.

**C-17.** Certain procurement lots of the C-17 Globemaster, a cargo and troop transport aircraft, offer one example of this type of case. The C-17, which is built in Long Beach, California, by Boeing (formerly McDonnell Douglas), was designed to incorporate as much commercial off-the-shelf (COTS) material and components as possible and, according to the prime contractor, has fewer than ten systems that are totally military unique.

The C-17 has been in service since 1993 and thus has a long history of cost data. However, the contractual aspects of this aircraft have been gradually moving downward on the continuum, away from CBA TINA data and toward PBA. The first eight lots of the C-17 were procured individually, with fully certified cost or pricing data. These early lots were somewhat problematic as the contractor tried, not always successfully, to keep costs under control. Considerable effort and a change in program management finally improved the situation to the point where Boeing was able to obtain authorization for a multi-year procurement for production lots 9 through 15. This multi-year procurement agreement was signed in 1996 for the FY 1996–2003 buys, for a total of 80 aircraft

In September 2001, the participants signed a contract modification for lot 12 (the FY 2002 buy) that changed this into an FFP contract with an Economic Price Adjustment (EPA) clause.<sup>8</sup> The Air Force had collected certified cost or pricing data up to that point; it then took action to transform the contracting process to a more commercial-like, PBA approach. The second multi-year buy (C-17 MYP II), encompassing the FY 2003–2008 lots and a total of 60 aircraft, was granted a TINA waiver.

The TINA waiver was based on the extensive historical cost or pricing data that existed and on the Joint Price Model (JPM) that was designed for use during price negotiations on future production lots

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<sup>8</sup> An EPA clause allows for negotiated prices to be adjusted later, during a contract's period of performance, if the inflation or price assumptions used during negotiations turn out to be different from the actual inflation or prices encountered during contract execution.

in the C-17 MYP II program.<sup>9</sup> During earlier phases of the program, Boeing and the Air Force worked together to develop a detailed “bottoms-up” Joint Cost Model (JCM) based on detailed cost data from CCDRs.<sup>10</sup> To help price the aircraft planned for procurement during the second multi-year agreement, the SPO and Boeing again worked together to develop a new high-level JPM based on historical C-17 prices, normalized for modifications based on Engineering Change Proposals (ECPs). This model did not include most of the lower-level detail found in the JCM, but it did benefit from the high-level cost or pricing data that had been collected in the past.

The Air Force officials we interviewed for this program indicated that they were not able to point to any quantifiable price savings that were clearly ascribable to PBA in the new contract. When the Air Force acquisition leadership issued the TINA waiver, part of the premise was that reduced contractor effort would mean reduced contractor overhead (which, presumably, would result in a lower price). Boeing argued at the time that it had considered the reduction in overhead costs when making its price offer. However, Air Force working-level officials that we interviewed saw no convincing evidence that the prices negotiated were any lower than they would have been under a CBA contract, although there clearly were some savings in the contracting effort because of the much smaller amount of cost data that had to be evaluated. Indeed, some of the interviewees believed the negotiated prices paid would have been lower if a full CBA approach had been pursued. There may have been savings from

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<sup>9</sup> The government explicitly avoided coming to any agreement with Boeing about the validity, accuracy, or applicability of the JPM, because any such agreement could have binding influences on the actual follow-on negotiations.

<sup>10</sup> See discussion in Chapter Two. CCDRs historically have been required on all major MDAP FAR Part 15 programs falling under the TINA requirement. FFP contracts and commercial systems awarded competitively and where competition continues have been excluded. CCDRs consist of four data reports that contractors must provide to the government. The first contains all actual recurring and nonrecurring costs based on the government WBS categories; the second contains costs by government-designated functional categories; the third contains costs by unit or system; the fourth (which has now been eliminated) covers plant business base and cost information related to overhead costs. In recent years, the requirements for CCDRs have been relaxed considerably. See Coonce, 2000.

other initiatives related to the multi-year agreement, but these savings would have been possible whether or not certified cost or pricing data were required.

Some of the people involved with the MYP II award had concerns that the program costs were not sufficiently understood to make the TINA waiver appropriate over such an extended period of production lots. In addition, concerns were expressed about a possible future follow-on buy of an additional 42 aircraft that had the potential to be procured under this same contractual agreement.<sup>11</sup> Regardless, senior Air Force acquisition officials had directed that PBA be used as the acquisition process on the C-17 MYP II.

**AMRAAM.** Another case for which DoD used an extensive history of uncertified cost data to establish a fair and reasonable price is the AIM-120 AMRAAM. AMRAAM is a joint Air Force–Navy program with an active radar guided missile that has a range of more than 30 miles and can operate in all weather and beyond visual range.

Initial production of AMRAAM for eight production lots was conducted as an annual competition between two suppliers, Hughes and Raytheon, and resulted each year in a split award (see description below). Although certified cost or pricing data were not required because there had been competition, DoD nonetheless collected a substantial quantity of uncertified cost or pricing data over the first 15 years of the program. Then, in the late 1990s, Raytheon bought Hughes. The Department of Justice and others in DoD were at first inclined to disallow this acquisition, because of anti-competition concerns; but Raytheon eventually was allowed to acquire Hughes if it would agree to a Long Term Pricing Agreement (LTPA) to ensure that the missile hardware costs would not increase in the absence of competition. (One of the major concerns was how DoD could continue to incentivize price reduction in the absence of competition.)

The AMRAAM SPO eventually ended up negotiating two LTPAs, the first without a TINA waiver and based on cost analysis of certified cost or pricing data, and the second with a TINA waiver and

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<sup>11</sup> This issue is discussed further in Chapter Five.

without certified cost or pricing data. Both LTPAs included a pricing model with threshold prices and “must-cost” price goals,<sup>12</sup> and adjustments for quantity and configuration. Historical cost improvement or learning curves, baseline assumptions regarding Air Force sales and FMS, and vendor quotes at different production rates were also used to develop the models.

The first LTPA was for production lots 12–15. The SPO attempted to obtain a TINA waiver for this negotiation, but senior Air Force acquisition authorities denied it. The negotiation took place in 1997, with the first lot of the LTPA (lot 12) awarded in 1998. The prices for lots 12–15 were based on a combination of the historical competitive prices, an Air Force cost analysis, and Raytheon’s agreement to further reduce the price. This combination made a TINA waiver unnecessary.

At that time, the contractor began engineering and manufacturing development (EMD) on a Pre-Planned Product Improvement (P3I) upgrade for the missile, called the AIM-120C7 variant. The contract for this effort included a CAIV unit price goal, which was carefully negotiated. The SPO developed various cost estimates based on analogous data; the contractor also conducted detailed cost estimates and shared some of these data with the DoD. The SPO went to the user (Air Combat Command) to determine what the users were willing to pay for the additional capability. These efforts suggested that a 15 percent price increase was a reasonable baseline estimate for procuring the new missiles with the additional capability. EMD for the C7 missile was a cost-plus award fee contract with certified cost data.

The second long-term pricing agreement, arrived at in March 2002, was for lots 16–21. This agreement was based on a TINA waiver and was a pilot program for PBA. The long history of AMRAAM production included relatively frequent configuration changes. Lot 16 included the first production of the P3I phase 3 con-

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<sup>12</sup> “Must-cost” prices are essentially prices deemed the maximum DoD could/would pay.

figuration designated AIM-120C7.<sup>13</sup> At present, this configuration is U.S.-only; the FMS version was the same as the old U.S. lot 12, an earlier version (AIM-120C5). The plan called for production of a mixed lot, to include the C5 missiles, which had a good production history and a considerable amount of cost data, and the new configuration (C7), which was to incorporate significant changes. Air Force leadership approved the PBA, despite the change in configuration, because of the price model and historical data.

AMRAAM has a joint (government-industry) factory pricing model. The program has a long history of being able to predict both the basic production cost and the cost of missile upgrades, in part because the SPO has access to Raytheon cost data when needed. Based on this history, Air Force leadership concluded that it would be appropriate to use PBA via a TINA waiver even though the production lots would include new missile configurations having no production cost history. Thus, a TINA waiver was granted for production, which was based on an FFP contract. As noted above, EMD for the new configuration was a cost-plus award fee contract with certified cost or pricing data.

## **Competition (FAR Part 15)**

In the second major category in our PBA taxonomy, competition (or the threat of competition) is what produces adequate justification that the price received by DoD is fair and reasonable under FAR Part 15. This competition is not necessarily expected to be “perfect” in the classical sense of economics textbooks—i.e., an unlimited number of producers selling interchangeable goods to an unlimited number of customers. In the defense arena, sufficient competition is assumed to exist when there are at least two producers (or when a single producer believes that others will bid), when there are reasonable substitutes and some kind of competition has been held, or when there are other

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<sup>13</sup> The computer and entire guidance section were changed, which is equivalent to about 70 percent of the cost.



competitive pressures sufficient to motivate the contractor to agree to keep its prices low for an extended period of time. We discuss each of these subcategories and applicable systems in the following sections.

For military items, competition is most common during the development phase, before DoD has selected the prime contractor for production. Occasionally, only one contractor is qualified to do the work, such as for nuclear-powered aircraft carriers. But in most cases, there are at least two contractors competing for the pre-EMD phase, and DoD in these cases will try to use its leverage over the final development contract award to motivate the prime contractors to agree to lower prices during production. However, competition can also occur during the production phase, with DoD expecting that the pressures to cut costs will more than compensate for the additional costs of supporting start-up and overhead costs for two manufacturing sites.<sup>14</sup>

Competition, rather than PBA, is the likely cause of the large majority of the price savings in these types of cases, but because competition falls into the PBA classification, with no TINA data required, we included it as part of our taxonomy. The usual postulated savings from reduced contractor effort as a result of not having to put together a TINA certified proposal and from DoD not having to review an entire TINA certified proposal do come into play here. But historically, many, if not most, competition cases have been structured to still require certified cost or pricing data, as noted in the case of the F100 versus F110 engine competition discussed below.

### **Dual-Sourced Production**

One clear form of competition occurs when there are two (or more) different contractors building the same system, which occurred, as discussed above, during the early production lots of AMRAAM. In the initial downselect, in February 1979, the Air Force chose Hughes Aircraft and Raytheon to compete for the final design downselect. During the 33-month demonstration/validation phase, the contrac-

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<sup>14</sup> See Birkler et al., 2001, for a more complete discussion of the relevant issues.

tors continued missile development by building actual hardware to demonstrate their technological concepts. After both contractors demonstrated their flight test missiles, Hughes won the development contract, in December 1981. The first two lots were awarded to Hughes, as was the third, but this included the industrialization of Raytheon for future production of the Hughes design. Lot 4 included the first “trial” competition; it was followed by seven years of intense direct head-to-head competition for lots 5–11, with both contractors supplying significant quantities of uncertified cost data.

During the first three real competitive lots (5–7), competition caused the unit recurring price to decline steeply. Another reason for the declining prices during this timeframe was that the AMRAAM Producibility Enhancement Program—a \$500 million program designed to reduce missile unit cost by making it more producible—introduced a newly redesigned main electronics assembly. During the following four competitive lots, 8–11, the price declined further, but at a much slower rate. The net result was that the missile hardware price declined significantly over the seven years.

It should be noted that near the end of the seven-year period, the annual quantities that DoD purchased began to decline dramatically, although the associated support and peripheral costs remained relatively unchanged. Thus, by the end of the seven years of competition, the missile hardware price had gone down significantly, but the total unit procurement cost, including the support package, had risen dramatically. Competition without a focus on total life-cycle costs did not work to keep costs low (discussed further in Chapter Five).

As was common during this period, even programs that were exempted from the requirement for certified cost and pricing data on the grounds of competition, such as AMRAAM, typically still collected significant quantities of contractor cost data. Thus, it is not surprising that neither DoD nor the contractor could identify significant savings in overhead and contracting process costs due to PBA based on competition. The cost data collected during this period, however, formed the basis for the joint factory pricing model that underpinned the TINA waiver and PBA approach later adopted on lots 16–21, as discussed above.

### **Competition Between Substitutes with a History of Cost Data**

Another type of competition that may not require extensive quantities of certified cost or pricing data arises when two contractors manufacture close substitutes that are not exactly the same but are similar in “form-fit-function.” Such a case existed during a phase of the competition between the Pratt & Whitney F100 and the General Electric (GE) F110 engines. One interesting point with respect to this case, however, is that for much of the period during which these two engines competed against each other, the Air Force still required certified cost or pricing data.

Both of these engines can power the F-15 and F-16 aircraft. Pratt & Whitney won the original contract, but reliability issues led DoD to bring on GE as a second competitive producer, with a leader-follower program.

Early in the competitive production phase of these programs, the Air Force allocated a percentage of the annual production buy to each of the two contractors based on a competition. It then negotiated a separate sole-source contract with each contractor under normal FAR Part 15 rules, which included the requirement for certified cost or pricing data.

Yet the combination of competition and years of detailed certified cost data provided by the contractor resulted eventually in a TINA waiver for the GE F110 engine in 1997. The multiple years of negotiated price data generated before that point were considered to provide a sufficient price baseline. This approach did reduce contract workload. Previously, the Air Force had received several thousand pages of data for every annual buy, all of which had to be certified by the contractor. In May 1997, the Air Force received only eight pages of data from GE.

To develop a fair and reasonable price, the government performed a regression analysis of several prior lot prices, factoring out profit, FMS, and inflation. The Air Force and the contractor engaged in extensive negotiations over price, eventually arriving at one that was mutually acceptable. However, the Air Force officials involved did not all see this price as being lower than it would have been without the TINA waiver.

The Air Force tried to make the case with GE that since the requirement for cost data was being reduced, there should be savings, which should be reflected in lower prices. But GE claimed that the cost data were needed for in-house use in any case, so they would still have to be generated and provided to management. According to some Air Force officials, the TINA waiver basically helped GE save photocopying costs. GE remained adamant that there were no real savings resulting from eliminating the TINA requirement, according to the SPO.

The TINA waiver did reduce workload for the SPO. Developing the government price position and briefing took two weeks instead of the usual six. Neither extensive cost analysis nor any plant visits were needed, because the planned buy was so similar to the previous one. DCAA and DCMA assistance was not required. The Air Force maintained the same level of staff and had the same number of price analysts, but the workers were able to spend their time on other cases that might have been less well analyzed otherwise. Overall, there was no reduction in program schedule. There was less work at the SPO, since the engineers did not have to provide a technical evaluation of the proposal.

When DoD has two contractors offering substitute items, as in this engine case, it frequently does not award 100 percent of the contract to one vendor or the other, even if one comes in at a lower cost. The costs of closing down and reopening a production line are great enough that if a contractor exits the market for one year, it might never be able to reenter the market. Historically, in the case of this engine competition, the production split has been either 50/50 or 60/40. In short, the engine buy is not fully competed but, rather, is more a directed buy.

In principle, any savings resulting from this type of competition might not be as great as they would be if either of the contractors could actually win 100 percent of the business. However, the approach selected maintains both engine suppliers and retains some degree of competitive pressure. In addition, having two contractors

has been recognized as improving the reliability of the engines the Air Force receives.<sup>15</sup> Price savings attributable in this case to the more PBA-like approach adopted when the TINA waiver was granted appear modest at best.

### **Substitutes Competing Internationally**

On 13 July 1999, Eleanor R. Spector, then Director of Defense Procurement, issued a letter modifying DoD policy on pricing issues in FMS contracts; and on 14 September 1999, a Defense Federal Acquisition Regulation (DFARS) final rule was issued. Among other things, the new regulation for the first time permitted COs to make a determination of adequate competition on the basis of a competition conducted by a foreign government. If such a determination is made, the CO must not require submission of certified cost or pricing data; instead, the CO is expected to consult with the foreign government through security assistance personnel to determine whether the criteria in FAR Part 15.403-1(b)(1) have been met.<sup>16</sup>

For this subcategory, too, the F-16 serves as an instructive example, this time through its sales to Israel, Greece, and other nations. Of particular interest here is the fact that the substantially modified variants of the F-16 that the prime contractor, Lockheed Martin, offered to foreign customers sometimes differed significantly from any other variants sold previously to the Air Force or to other foreign customers. The first two cases illustrate the interesting variations on this application of PBA.

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<sup>15</sup> For studies of the F100's development and the resulting "Great Engine War" between Pratt & Whitney and GE, see Camm, 1993; Ogg, 1987; Drewes, 1987; Kennedy, 1985; and Mayes, 1988.

<sup>16</sup> When a foreign country purchases an American weapon system through the FMS process, DoD carries out the procurement process as it would for a U.S. procurement, per DFARS 225.7301(b). The foreign customer pays DoD a fee for this service. More recently, Direct Commercial Sales have become more popular. In these, the foreign buyer negotiates directly with the U.S. contractor for price and contract terms, and the U.S. contractor has to go through the very complex U.S. arms export control process administered by the State Department.

In July 1999, after many months of negotiation with Lockheed Martin and Boeing (formerly McDonnell Douglas) in what was a very intensive competition, Israel selected Lockheed's F-16 over Boeing's F-15. Price was a key factor in the negotiations, and the Israelis were able to use the competition to obtain what they believed was a very good price. In accordance with DFARS 225.7303(b), it was determined that there was adequate price competition, and this was used to establish the price of the FMS contract.

In the second case, the Hellenic (Greek) Air Force (HAF) selected the F-16 in June of 2000 after considering four other aircraft—including the F-15, the European multinational Typhoon, and the Swedish Gripen—in what it viewed as primarily a technical competition rather than a price competition. The HAF intended to purchase the F-16 through the normal FMS process, with DoD negotiating a fair and reasonable price based on a traditional, CBA approach that included TINA compliant cost or pricing data. This had been the Greek experience on previous F-16 and other purchases.

However, Lockheed Martin argued that the intense competition had caused its final bid to be the lowest possible price and should be grounds to relieve it of the additional burden of going through the entire CBA process and providing full certified cost or pricing data. In addition to the DFARS change permitting this approach, there were two precedents for Lockheed's position: the previously mentioned Israeli buy, which had just been accomplished using this method, and a competition with price as a factor that Norway had been conducting (although this latter buy was cancelled for budgetary reasons). These competitions may have created a new paradigm in the view of some officials in the U.S. government and at Lockheed Martin, but the HAF did not share that view.

A compromise was eventually found. The SPO used a TINA waiver to conduct price-based negotiations on the HAF's behalf, which resulted in a modest price reduction compared with Lockheed Martin's "best and final offer." The TINA waiver was based on a price comparison with the recently priced Israeli aircraft, the competitive price proposal offered to Norway, and the Viper Cost Model (a

cost model for a theoretical FMS aircraft to be used as a basis for CBA pricing).

As noted above, USD(AT&L) revised the regulations in 1999 to allow competitions conducted by foreign government to be used as a basis for determining adequate price competition. Overall, there is working-level support for this approach, with some reservations. In particular, there is concern about how to deal both with nonrecurring costs on modified versions of items and with offset costs. The regulatory environment limits the combination of CBA approaches on some parts and TINA waivers on other parts of the same contract award. If a PBA approach (a full TINA waiver or foreign-government-conducted competition) is used in the case of a significantly modified item for a foreign customer, estimating complexities arise, and government cost analysts raise concerns about whether the modifications are being offered at a fair and reasonable price.<sup>17</sup>

### **EMD Competition Leading to FFP and Long-Term PPCC**

Three AAC programs that have broken new ground in the past decade in their use of PBA—Joint Direct Attack Munition (JDAM), Wind Corrected Munitions Dispenser (WCMD), and Joint Air-to-Surface Stand-off Missile (JASSM)—provide some of the most dramatic cases of PBA innovation. They are clearly military-unique programs, yet DoD has gone far toward the PBA end of the continuum with them, collecting minimal quantities of cost data or none at all from the contractor during production and adopting many other commercial-like acquisition approaches. These three programs have been used as demonstration, or flagship, programs for a number of acquisition reform initiatives, not merely PBA.<sup>18</sup>

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<sup>17</sup> The GAO was critical of the Greek F-16 case largely because of the reasons cited here. See U.S. General Accounting Office, 2002.

<sup>18</sup> As noted in Chapter One, we conducted extensive interviews with both SPO and contractor officials involved in all three of these programs, as well as many of the other programs examined in this report. However, at the time of this writing, the JASSM SPO had not cleared any of the information obtained from the JASSM SPO or JASSM prime contractor for public release. All information on JASSM included in this report is based on published, open-source materials, the most important of which are Lorell and Graser, 2001; and Levin,

These programs share several features, the first being an intensely competitive environment for the SDD award, in which multiple contractors attempted to win the business. The winners agreed to FFPs for the initial production lots following development as part of their proposals *prior* to the award for full-scale development. And they used one or both of two other innovative pricing approaches: (1) long-term production price commitment curves (PPCCs) that establish an upper limit on prices for subsequent lots (with price bands for quantity variations); (2) acceptance of an average unit procurement price requirement (AUPPR) for all units up to a pre-agreed total number.<sup>19</sup> Notice that with an AUPPR, prices within and among lots can vary significantly, as long as the average unit procurement price (AUPP) over the entire agreed-upon total quantity equals the negotiated number in constant dollars.

Furthermore, the three programs feature a variety of incentives for ensuring that prices remain within the PPCC and AUPPR during production (i.e., “carrots”) and sanctions for use if prices exceed goals (i.e., “sticks”). The incentives for keeping prices within agreed bounds include continuing sole-source status and no requirement to provide certified cost or pricing data. Available sanctions include DoD possibly re-competing the procurement, a requirement to provide certified cost or pricing data for production lots, and DoD deciding to require the contractor to qualify a second source. These incentives and sanctions have the goal of mitigating one of the major risks in sole-source production, particularly in a PBA-like approach: that the contractor will raise the prices with the certain knowledge that DoD has no place else to go for the needed goods.

A key area of contention among many DoD cost estimators and contracting officials was whether these programs permit the contractor to enjoy “excessive” profit margins, especially on later production lots. Supporters of these programs pointed out that the initial compe-

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2003. For a more complete discussion of these programs as acquisition reform case studies promoting greater CMI, see Lorell et al., 2000.

<sup>19</sup> In some of these programs, the AUPPR was a key performance parameter and an integral part of the Operational Requirements Document.



tion, which was guided by very challenging unit production price goals and thresholds, led to initial FFPs far below historical levels and, in fact, far below what was predicted at the beginning of the development programs. And PBA advocates argued, of course, that given the environment of initial competition and the resultant overall positive price outcome, DoD should not be concerned with the level of profit enjoyed by the contractor. We discuss this issue further in Chapter Five.

**JDAM.** The first of the three programs in this subcategory is JDAM. The JDAM itself is a kit that is attached to conventional bombs; what it does is increase the accuracy with which the bombs hit their targets by using an inertial guidance system and the global positioning system (GPS) for guidance.

Originally, there was intense competition among seven companies for the role of JDAM prime contractor, which drove many of them to be innovative in their pricing strategies. The RFP required FFPs for early lots and PPCCs for follow-on contracts, with separate average unit procurement price commitments (AUPPCs) for each lot. These commitments were required *before* downselect and the beginning of full-scale development. JDAM has been an extremely successful program, with a large increase in the overall demand for the kits. Boeing (formerly McDonnell Douglas), the winning contractor, has held its prices steady in the face of increased demand, which has remained in constant dollars at less than 50 percent of the original threshold price established by the Air Force and the Navy.<sup>20</sup>

JDAM EMD resulted from a competition, so the government did not need to require the full spectrum of certified cost or pricing data for development or for production prices. Affordability was the most important priority in source selection, so before the downselect, the competing contractors submitted periodic affordability reports.

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<sup>20</sup> One normally expects that as cumulative production quantities increase, costs/prices will decrease because of reduced labor per unit (a variable cost). However, in the case of the additional JDAMs, the increase in the quantity buy was so large that it exceeded Boeing's production capacity, requiring new production capacity (a fixed cost). Thus, the case made by Boeing was that the fixed cost per unit was at least equal to the learning curve (variable cost) savings, so DoD was still getting a good deal at the previously negotiated price.

Each report was supposed to show the progress the contractors were making to meet the affordability goals, following the CAIV approach. DoD obtained insight into contractor costs during the first phase of EMD because of the information in these affordability reports, but did not receive the usual massive amount of highly detailed and certified cost or pricing data for this price-based procurement.<sup>21</sup>

**WCMD.** The WCMD is an inertial guidance kit (without GPS) for use on certain kinds of “dumb” area munitions. Originally, eight contractors competed for the WCMD system, with an initial downselect to two, Lockheed Martin and Alliant Tech Systems, in 1995. Lockheed Martin won the full-scale development contract in 1997. The program structure and intense competition led the contractor to agree in advance to prices for the first eight production lots. The first two of these (LRIP 1 and 2) were planned to be FFP, unilaterally exercisable by the Air Force. The next six (LRIP 3 and FRP 1–5) were to be procured under a Procurement Price Commitment Agreement (PPCA), which is similar to a PPCC. The Air Force and the contractor developed a table with the prices for which Lockheed Martin would provide a certain quantity of WCMDs. The Air Force had to stay within a plus-or-minus-quantity percentage band to keep the contract in force; if it decided to buy quantities outside the band, the price would be subject to renegotiation. The terms included an AUPPR for the first 40,000 units. The negotiated AUPP was less than 40 percent of the initial price threshold established by the Air Force.

This contract agreement for production lots was not unilaterally exercisable, but there were penalties if the contractor chose not to comply. For example, the Air Force could require Lockheed Martin to provide a Technical Data Package (TDP) whose information could be used to re-compete the production lot or bring on a second source.

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<sup>21</sup> Boeing has noted that it did provide significant insight, visibility, and detailed cost or pricing “information” prior to final downselect. This included cost estimates by WBS in both the affordability report and the final proposal. According to Boeing, the information provided was less than that required for a traditional, CBA; however, it probably was not substantially less.

Lockheed Martin did provide some cost data as part of the initial downselect in the form of an affordability volume, which was prepared as part of the resource management plan. The cost or pricing data were not certified, but they were very detailed, with cost breakdown data on how the contractor would meet the price. However, as the program entered production, budget constraints caused the Air Force annual buys to fall below the quantity expectations laid out in the acquisition strategy. Lockheed Martin has been unable to support the AUPPR at the reduced quantity and is now providing certified cost or pricing data to enable the Air Force to assess a fair and reasonable adjustment to the original AUPPR pricing.

**JASSM.** The Lockheed Martin JASSM program is larger, more complex, and in many respects relating to contracting more unusual than either JDAM or WCMD. The JASSM is an autonomous, long-range, conventional, air-to-ground, precision stand-off missile for the U.S. Air Force and Navy. Launched from both fighter and bomber aircraft, it is designed to destroy high-value, well-defended, fixed and relocatable targets. JASSM's significant stand-off range is intended to keep Air Force and Navy aircrews well out of danger from hostile air defense systems. The program was established to replace the cancelled Tri-Service Stand-off Attack Missile (TSSAM) that was designed as a high-survivability stand-off weapon.

JASSM is unique in part because Lockheed Martin, the winning contractor in the final competition with Boeing, adopted a clear and aggressive commercial pricing strategy to gain market access, stimulate demand, and win the competition.

The ongoing competition with Boeing during the early phases of the program resulted in the agreement by Lockheed Martin for the delivery of the first 2,400 units in the first nine lots at an AUPP of about \$400,000 in base year 1995 dollars (BY95\$), which is more than 40 percent below the threshold price originally estimated by the Air Force and the Navy.<sup>22</sup>

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<sup>22</sup> Lockheed Martin and Boeing competed during the program definition and risk reduction phase of the program. Prior to selection of a winning contractor for full-scale development during the follow-on EMD phase, both contractors had to submit final proposals that

The original JASSM procurement strategy is difficult for some traditional cost analysts to accept, since the price does not decrease over time as it would under a traditional cost-plus fee structure, where unit costs normally decline as the contractor comes down an “improvement,” or “learning,” curve.<sup>23</sup> According to published information from the JASSM SPO, Lockheed Martin adopted a “very aggressive pricing” strategy with FFPs for the first five production lots. The “commercial pricing” of lots 1–5 assumed the use of PBA for the follow-on lots, 6–9. Since this aggressive commercial pricing led to an aggregate average unit cost below \$400,000 in BY95\$ for the first five production lots, the clear implication was that the average unit procurement price for lots 6–9 could and probably would rise above the overall AUPP of \$400,000. Many people thought that elimination of a direct competitor and DoD’s being locked in with a sole source, coupled with Lockheed’s need to make a profit on the JASSM program, would result in increased AUPPs after lot 5. In theory, Lockheed could raise the price for lots 6–9 so that the average price for the entire buy of 2,400 became \$400,000 and still meet its agreement with the Air Force. Even though both DoD and the contractor were open and above board regarding this commercial pricing strategy from the very beginning, some officials in the cost estimating community became uncomfortable with a program in

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included offers of fixed unit prices as a function of quantity for some of the early procurement production lots. For a missile buy of 2,400, the government established a threshold average unit procurement price requirement of \$700,000 (BY95\$) over which the missile would not be procured, and a lower target average unit procurement price of \$400,000 (BY95\$). Lockheed Martin’s winning proposal price was well below the threshold price and the target price, as was Boeing’s. While these prices were revised up later, the AUPP for the first five lots remained below \$400,000 (BY95\$). See Lorell et al., 2000.

<sup>23</sup> While this is also true of the JDAM case, DoD cost estimators have not raised this issue regarding JDAM. One reason why they may not have is that JDAM may be viewed as virtually a low-priced commodity item compared to the much more expensive JASSM. (JDAM’s unit price is roughly 5 percent of JASSM’s. And JDAM is being procured in six-figure numbers, whereas JASSM is planned for four-figure numbers.) Perhaps more important is that while JDAM’s unit price has remained essentially flat, JASSM’s was expected by many to go up while still meeting original contractual requirements.

which the procured item's price might jump up in real terms in later lots instead of going down the traditional learning curve.<sup>24</sup>

In addition, the agreement initially extended out only for the first 2,400 units (lots 1–9). After that, the contractor was not committed to any particular price and thus could in theory charge whatever the market (or government customer) would bear. However, the JASSM program was designed to remove some of the risks of significant price increases. For example, if uncomfortable with the price being offered, the Air Force can ask for certified cost data.<sup>25</sup> Presumably, the contractor will be incentivized to set its prices so as to get the “carrot”—i.e., to remain the sole-source provider for this Air Force business—without facing any of the “sticks.”

Another early PBA implementation challenge for the JASSM program was a planned major modification and upgrade program to develop an extended range (ER) variant. Initially, there were few or no baseline cost or pricing data for the Air Force to use in assessing the price of this variant.<sup>26</sup> Eventually, however, it became increasingly likely that no TINA waiver would be made available for lots 6–9, in which case certified cost or pricing data would be required, thus ending JASSM's history as one of the most aggressive and unusual PBA pilot programs on record.

While these three programs showed enormous innovation in PBA approaches as well as many areas of acquisition reform, at least

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<sup>24</sup> This paragraph is based entirely on Levin, 2003. The government accepted this approach because it placed greater near-term cost risk on the contractor (there was no guarantee that lots 6–9 and later would be procured) and provided the government with a bargain-basement unit procurement price on the initial production lots that is almost certainly well below what would have been paid under a traditional, CBA contract. However, what worried some cost estimators was that the total procurement cost of very large numbers of JASSMs well beyond the currently planned lots would exceed what the overall cost would have been under a traditional, CBA contract. This concern also applies to JDAM. PBA proponents countered that the initial JASSM lots might not even have been procured at all if they had been priced in a traditional manner in accordance with CBA.

<sup>25</sup> This is indeed what is likely to happen (see *Inside the Air Force*, 2003).

<sup>26</sup> The actual cost to develop and produce the new design and components of the upgraded version would be tracked with certified cost or pricing data. Some costers complained, however, that it would still be difficult to cost the baseline JASSM configuration without formal certified cost or pricing data.

two of them are or are likely to soon become more traditional, CBA-type programs because of significant changes in the programs since the original acquisition strategy was established.

## Commercial Determination (FAR Part 12)

An item that is determined to be a commercial item—as defined under FAR Part 15.403-1(c)(3) and in FAR Part 2.101 (see FAR Part 12 for policies and procedures)—is exempt from the requirement for cost or pricing data. As described elsewhere in this report, a different set of regulations determines the procedures to be followed during the acquisition process for commercial items. The underlying assumption is that competition in commercial markets serves as a force to keep prices fair and reasonable, since customers in commercial markets have alternatives, and their ability to choose lower-priced substitutes deters sellers from “excessive” price increases and “price gouging.”

We have formulated three broad subcategories under this classification in our PBA taxonomy. The first consists of truly commercial items that were developed for the civilian commercial market and actually have civilian commercial sales.<sup>27</sup> The second consists of military-unique items that have been granted a commercial determination from senior levels of the Air Force acquisition organization. The justification for these items is they have technically been offered for sale to non-governmental entities or the general public but have not necessarily generated actual sales. The third subcategory, which is similar to the second, comes into play when a contractor invests its own

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<sup>27</sup> The term *commercial* can be ambiguous and confusing. Nearly all U.S. defense contractors, even if they sell exclusively to the military, are technically “commercial” firms, because they are privately owned and in business to make a profit. In this sense, all of their products, even if sold only to the armed forces, are commercial. When a foreign government negotiates directly with a U.S. contractor to purchase a military-unique item, this is called a “direct commercial sale.” However, the FAR definitions of *commercial* make it clear that the term is primarily used for items meant to be offered for sale to the general public rather than only to government entities. Thus, the vast majority of these items are not military unique but, instead, essentially civilian or at least dual-use. To make this distinction clear, we use the term *civilian commercial*. See FAR Part 2.101 for the definition of commercial items.

money to develop or upgrade a military-unique system and then offers (or could offer) the new item or the modification to non-governmental entities or the general public. Again, this type of item may or may not have resulted in sales outside the U.S. military.

It became clear during our research that some items that have been declared “commercial” in accordance with the FARs would not normally be considered true civilian commercial items. In some of the more ambiguous cases, what DoD has done is make a “commercial” determination to meet some other goal. In our judgment, the appropriateness of the FAR Part 12 determinations varies from case to case. There are real distinctions in how these items should be judged, from truly commercial items to ones for which the commercial determination has been made despite the risks entailed in removing the requirement for certified cost or pricing data from a program that is not inherently civilian commercial. In fact, senior Air Force acquisition officials have sometimes made commercial determinations that are contrary to the judgment of the working-level SPO and contracting personnel. To a certain extent, these instances may have stemmed from philosophical differences, leadership being more forward thinking and willing to take more risks than the more conservative working-level officials. However, based on our analysis, some of these FAR Part 12 PBA cases seem of questionable appropriateness, with no verifiable benefits that clearly make up for the perceived risks. These issues are discussed further in Chapter Five.

### **Commercial Items Developed for the Civilian Commercial Market**

The first subcategory of commercial FAR Part 12 PBA is the clearest; it comprises items clearly developed for and extensively sold in the civilian commercial market as commonly understood in normal discourse. In these cases, DoD should be able to perform a price analysis of the item and assess alternatives to make a determination of fair and reasonable price. However, even in this subcategory there are some concerns, in this case related to the area of market research. The problem is that COs do not always receive the training needed to conduct effective market research, and listed market or catalog prices may not address all the terms and conditions of specific sales. For

example, it is very difficult to determine all the terms and conditions involved in commercial aircraft sales.

**C-40A.** The C-40A is a military transport aircraft that is a close derivative of Boeing's 737-700C, an aircraft originally developed for the civil aviation market. This Federal Aviation Administration (FAA) certified aircraft accommodates 120 passengers, eight pallets of cargo, or a combined configuration consisting of three pallets and 70 passengers. It is powered by commercially available engines, two CFM56-7s developed jointly by GE and SNECMA.

The C-40A is offered commercially as the 737, so it is exempt from the provision of cost data under FAR Part 12. Unlike cases in which contractors have planned to offer their products to the commercial market but have generated no commercial sales, or have argued that their items were commercial and had them declared as such by a DoD determination, this case claims numerous existing commercial buyers of the item. DoD initially bought a single catalog aircraft with some modification work.

Given that the 737 is a civilian commercial item, Boeing offered DoD price information rather than certified cost or pricing data. During the price analysis, Boeing offered controlled access to prices paid by commercial customers, which provided the DoD COs with assurances that DoD was receiving the most favored customer price.

It should be noted that if Boeing had not provided market pricing data, it would have been challenging for the DoD analysts to make a fair and reasonable determination, because it is very difficult to identify and normalize commercial aircraft prices actually paid. Commercial vendors routinely provide catalog prices, but the prices that customers actually pay are highly proprietary and are very closely held. So, while DoD knew what the publicly available catalog prices were, they in no way reflected actual prices in the commercial aircraft market, because commercial airlines typically obtain a variety of financing incentives, warranties, maintenance, and other offsets that affect the true cost to buy.

Despite the difficulties DoD faces in conducting market research to determine whether a price is fair and reasonable, our respondents agreed that this type of acquisition represents a case in



which a commercial FAR Part 12 acquisition is perfectly appropriate. It is not even a question of saving money or time in collecting or reviewing costs but, rather, one of following standard commercial practice for the procurement of a commercial item. Obtaining formal certified cost or pricing data in the DoD format from Boeing's commercial aircraft division would pose major challenges to both DoD and the contractor.

### **Military Item Designated Commercial**

The second subcategory of our PBA taxonomy of commercial FAR Part 12 items covers military-unique items or modifications of such items offered for sale to the general public or to non-governmental entities. Two cases that fall in this subcategory are the Joint Primary Air Training System (JPATS) T-6A Texan II and the C-17.<sup>28</sup>

**T-6A.** The T-6A (Texan) is a single-engine, turboprop training aircraft being procured by both the Air Force and the Navy as part of the overall JPATS.<sup>29</sup> In 1996, Raytheon Aircraft Company in Wichita, Kansas, won the contract after a competition among seven aircraft manufacturers. The aircraft, a modification of the privately developed PC-7 trainer made by Pilatus Aircraft of Switzerland, was designed to be an inexpensive military trainer that would mimic jet performance.

During the development phase, Raytheon estimated that FMS would be significant and offered prices for lots 2–8 based on this belief. Lots 2–6 were FFP with an economic price adjustment (EPA) to account for inflation. Lots 7 and 8 were a not-to-exceed FFP EPA. Prices for these two lots were settled on during the 1998–1999 time frame, and Raytheon had to submit certified cost and pricing data to support a determination of a fair and reasonable price. Expected FMS did not materialize, however. Furthermore, the basic aircraft design ended up being far more modified for the Air Force than originally anticipated. Although the data indicated that the aircraft would

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<sup>28</sup> More specifically, the C-17 MYP II. As we discuss, this effort to achieve a commercial determination ultimately did not succeed.

<sup>29</sup> JPATS consists of the aircraft and the ground training devices and scheduling systems.

actually cost 40 to 50 percent more than the negotiated not-to-exceed price, Raytheon honored the original price agreement for these lots.<sup>30</sup>

In the summer of 2000, Raytheon and the SPO began discussing prices for lots 9–13, with both sides predicting a significant increase in the average unit price. The final estimates were not far apart, but when the Air Force operational community balked at the higher price, Air Force acquisition leadership set up a joint estimating team (JET) to examine the issue. The JET came up with 11 initiatives to cut costs, which were expected to reduce the unit price considerably. These included a recommendation for FAR Part 12 commercial status for JPATS, with commercial-style progress payments, which would allow Raytheon to collect its money earlier based on progress in producing each aircraft. In October 2000, this option was briefed to senior Air Force leadership, which then made the decision to declare the JPATS a commercial program. The contract was signed in December 2000, making lots 7 and 8 FAR Part 12, although at the same FFP. No certified cost or pricing data were required for future lots.

The commercial determination was very contentious, with the SPO uncomfortable with the change, especially given the program's history of cost escalation. The price analysts wanted to stay with FAR Part 15 in order to obtain additional cost data to establish a good data foundation; the acquisition strategy could be reassessed later. However, it was argued that since the JPATS was a modification of the privately developed Pilatus aircraft, it could be considered commercial, even though Raytheon's extensive modifications made it a vastly different aircraft. Officially, a commercial Model 3000 paper design variant had been FAA certified and was available in principle to non-government customers, but it has never been built or sold in the civilian commercial market. The T-6A is sold as a Model 3000 with military deviations, as an FAA certified aircraft. Furthermore, one of the benefits of declaring the item commercial was supposed to

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<sup>30</sup> The major causes for the increase in price were the modifications of the baseline aircraft being far more extensive than originally anticipated and the failure of the expected large-scale foreign sales to materialize.

be a reduced price, so DoD had incentive to adopt a commercial-like acquisition strategy.

Although it cannot be demonstrated that the commercial determination resulted in a price lower than what would have been achieved via a FAR Part 15 contract, the CO determined that all prices were fair and reasonable. The contractor submitted full cost information, which was considered factual and was fully relied upon for the development of the Air Force objective and negotiated amounts. For example, Raytheon lowered its price for lot 9 aircraft to a level suggested as the upper ceiling by Air Force leadership before the commercial determination was made. It appears that lot 10 prices are inordinately high. However, the fact is that the lot 9 negotiated prices are lower than the Air Force evaluated prices.

The SPO did agree that the commercial determination led to reduced workload in the contract award process, allowing it to concentrate on other work. It had enough cost history and had performed enough market research to determine price reasonableness. The cost data made available for lots 9–13 were from the same accounting system, so they were very similar to data used for previous lots. However, there was some concern that the Air Force had given up useful cost data for no significant price reductions.

For future buys, the Air Force has the uncertified cost information and some projected data to serve as a foundation for starting a lot 14 proposal evaluation. The lot 14 JPATS is designated as a FAR Part 12 commercial aircraft, so the Air Force can neither obtain certified cost or pricing data nor gain insights into labor rates and overhead rates to know what is included in costs. Nevertheless, COs believe that there is enough cost history to work with and that further market research will make it possible to arrive at another determination of fair and reasonable prices.

**C-17.** The C-17 is another case in which attempts were made to declare a major system designed for the military to be commercial in accordance with FAR Part 12 definitions. This occurred in 2001, during discussions over the second multi-year buy. The SPO, Boeing, and DCMA spent two weeks in intense face-to-face discussions. In a top-down push, Air Force acquisition leadership told the SPO that

the C-17 follow-on buy was going to be FAR Part 12. There was some indication that Congress was considering legislation requiring this, although five senators signed a letter opposing a FAR Part 12 determination. In the end, the effort to declare the C-17 a commercial item was driven by Air Force acquisition leadership. However, later during the negotiations, after the parties had agreed in principle on a FAR Part 12 price, the requirement to obtain a commercial contract was rescinded, and Air Force leadership asked for a FAR Part 15 contract with a commercial-like clause (as described above).<sup>31</sup>

Both of these case studies represent the potential pitfalls of declaring military-unique items commercial under the rules of FAR Part 12. Both aircraft are used only for military purposes. The JPATS was developed from a privately developed military-unique item, the Pilatus PC-7, using a classic military EMD program, and the resulting Raytheon aircraft has very little commonality with the original Pilatus PC-7. And while there are commercial cargo aircraft based on civilian transports, and the C-17 has only a few military-unique subsystems and other items, the C-17 is a totally military-unique design and is used solely for military missions and has only one buyer.<sup>32</sup> In both of these cases, the Air Force was willing to give up the collection of certified cost or pricing data for uncertain benefit. Nonetheless, the Air Force was able to declare fair and reasonable prices in accordance with the rules established by the FARs.

### **Military-Unique Item, Contractor Funded R&D, Offered Commercially**

In our last subcategory of FAR Part 12 PBA, the contractor develops or extensively modifies military-unique items with its own money

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<sup>31</sup> These parties do not, of course, negotiate whether an acquisition is Part 12 or not. The SPO (CO) determines, based on information available, whether or not to apply for approval of a TINA waiver or a commercial item determination. The contractor can provide input into that decision, but the decision is not a negotiation. In this case, though, the decision was provided from on high.

<sup>32</sup> In 2000, the UK Royal Air Force signed a contract with Boeing to lease four C-17s. Both the U.S. Air Force and Boeing have seriously examined the development of a civilian commercial variant of the C-17 and its marketing to private cargo transport companies. To date, however, no sales have been made.

and also offers them on the commercial market.<sup>33</sup> Cases have varied from relatively simple items, such as modification kits for engines, to complex items, such as entire aircraft. We offer for this subcategory one case in which the use of PBA appears to be appropriate (the T-38 engine modernization) and another in which the use of PBA is questionable (the C-130J).

**T-38 Engine Modernization.** The T-38 is a high-altitude, supersonic jet training aircraft developed by Northrop and first fielded in 1961. The aircraft is powered by two GE J85 engines, variants of which have been sold commercially to civilian buyers by GE.<sup>34</sup>

Using its own funds, GE developed an upgrade kit with two major new subcomponents to improve the functioning of the engine. Air Force estimates suggest that GE may have invested significant funding in this effort, and GE planned to publish a commercial catalog price for the kits. The Air Force user, Air Education and Training Command (AETC), was interested in these engine upgrade kits because it wanted more power and efficiency from its J-85s. Before the upgrade, the engines did not completely meet the current training criteria, were using too much fuel, and were not powerful enough to support the necessary T-38 flight capabilities. The new kit would also extend the useful life of the engines.

This was a commercial FAR Part 12 acquisition from the very beginning, an approach that was determined by the Air Force leadership. It took eight to 12 months from the time negotiations started to get the kits on contract, because COs were breaking new ground. This was the first time the Air Force had procured anything of this kind that was commercially priced, and the main concern was to obtain and justify a fair and reasonable price. To make this price determination, the Air Force wanted to gain insight into the business model that GE had developed to justify its pricing. The Air Force was especially interested in how the nonrecurring costs that GE had

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<sup>33</sup> The original Pilatus PC-7 fits this category, but the developer was a foreign company.

<sup>34</sup> The civilian commercial version of the J85 is the CJ610 engine used on business jets.

exclusively paid for would be recovered and spread out over the production engines.<sup>35</sup>

To help justify the price, the Air Force used data from other engine programs and from spare parts for other engines to try to understand the pricing of similar items. It also gained some insight into the GE internal business case. If the Air Force had decided to use cost-based methods for the acquisition, GE would have had greater difficulties recouping its R&D costs as part of the production contract and might have been deterred from adopting this sort of approach ever again.

Because this acquisition method was so new, the price analysts did not believe that this methodology saved any time over the cost-based contracting method, although DCMA may have enjoyed a reduced workload.

In this case, the lack of certified cost or pricing data did not appear to negatively affect the Air Force, and there was reasonable justification for using a PBA approach. The engine modification kit was offered commercially, and there were, in fact, commercial sales of the kit. The Air Force gained access to company cost or pricing information that helped verify a fair and reasonable price.

Indeed, the J85 and its civilian variant, the CJ610, along with the modification kit, could arguably be defined as dual-use items rather than truly military-unique items.<sup>36</sup>

In other cases in which military items have been developed or modified with company funds and offered commercially, PBA may

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<sup>35</sup> The internal GE business case for developing the modification kits with company funds was not shared with RAND. However, the existence of a civilian commercial market for the civilian variant of the J85 and the applicability of the modification kit to the civilian variant are likely to have played an important role.

<sup>36</sup> The J85 was originally developed in the late 1950s by the Air Force as a power plant for lightweight fighters and was used on the Northrop F-5 Freedom Fighter. Later, GE developed a civilian variant called the CJ610 for the civilian business-jet market. Historically, the commonality between military and civilian jet engines has been considerable, although the military has funded most of the basic development work, and the commercial variants have come later. In more recent years, military and commercial engine technologies have increasingly diverged, as contractors have supported the development of very high thrust large turbo fans for large civilian wide-body passenger-transport aircraft.

be harder to justify, and the C-130J procurement may be just such a case.

**C-130J.** Almost five decades have passed since the Air Force took delivery of the first C-130 transport aircraft. This medium tactical airlifter has been upgraded numerous times and has been developed into many variants; the most recent model is the C-130J. A variety of performance upgrades have been incorporated based on new sub-systems and components, including new engines and props, a new “glass cockpit,” other new avionics, and so forth.

Unlike the previous upgrades of the C-130, the most recent one was driven in large part by Lockheed Martin itself. The company funded all the R&D investments necessary for the upgrade, partly in the expectation that the aircraft would eventually be widely sold to U.S. and foreign military customers. Lockheed paid for FAA certification. However, the C-130J was also offered to a wider, general market, rather than just to DoD and other military customers. Eventually, the C-130J received a commercial FAR Part 12 determination from the U.S. government.

Some COs and other Air Force officials remain uncomfortable with the commercial PBA approach that has been adopted and believe that the commercial determination was made too quickly. One contentious issue is whether the pricing model used to justify that the price was fair and reasonable was adequate. Lacking cost information, the Air Force relied on a model based on historical data from other transport aircraft. The model included both military and civilian aircraft, and parametric analysis showed that Lockheed Martin was charging a reasonable price for the aircraft. However, some Air Force officials have questioned the model, noting that several important analogous aircraft were left out, such as the C-130H (the previous variant of the C-130). Others have questioned some of the metrics and measures of merit used in the model.

However, the commercial determination in this case certainly appears to have at least some benefits, one of which is that procurement contracts are easier and less time-consuming to negotiate. The SPO estimates that Lockheed can now be put on contract with approximately 30 to 40 percent time savings compared with what

would take place with a typical CBA contract. It previously took nine months but had come down to four to six months. Another metric, pages of data in the proposals, has also decreased dramatically, falling from 750 to 800 pages of certified data in 1994 to 30 to 50 pages now, which includes a pricing table for the aircraft. And previously, the data had to be recertified every three or four months and resubmitted every four to six months, with Lockheed Martin submitting new proposals when quantities changed. The contractor generally had to do this three or four times until quantities and requirements stabilized, which represented significant effort. Finally, whereas the SPO used to have seven COs working the C-130H, there are now four for the C-130J. However, these workforce reductions may have come about anyway, regardless of whether the C-130J was procured through PBA, because of ongoing Air Force reductions in the acquisition workforce.

Under the price-based methodology, the Air Force likely did not save any money on the C-130J procurement. However, it may not have been able to afford the more capable aircraft if it had had to fund the development itself through a typical CBA development contract. Lockheed Martin took a major risk by making nonrecurring investments that might not have resulted in sales. According to published sources, the prime contractor originally estimated \$300 million in development costs. Due to a variety of technical and programmatic issues, this number grew to \$600 million, then to \$1.2 billion, and finally to \$1.4–1.5 billion.

The unit procurement price is considerably higher for the C-130J than for the C-130H, partly because the contractor must recover its nonrecurring costs. At the same time, the C-130J is a more capable aircraft than the H version (although it has experienced considerable technical “teething” problems). Under PBA, the Air Force and other DoD entities are getting an improved tactical transport but are paying a much higher unit price. Without cost or pricing data, it is nearly impossible for DoD analysts to determine with precision whether DoD is getting a better deal than it would have under a CBA approach.



## Concluding Observations

The PBA taxonomy we developed demonstrates the wide range of circumstances in which PBA-like approaches have been adopted by DoD, as well as the numerous allowable justifications for nonsubmission of TINA certified cost data. The case studies reveal that PBA has been more or less appropriately applied by DoD in most instances and that many legitimate concerns, challenges, and issues remain regarding its application. Nonetheless, it did become clear in the course of the study that PBA is a useful component in the CO's toolkit, adding flexibility to the contract award process and offering the potential to save costs and effort, at least on a modest level.

Many of the issues raised by these case studies that go beyond the basic contracting process, as discussed in Chapters Two and Three, and that are covered by our original research questions 5 and 6, as laid out in Chapter One, are examined further in the next chapter.



## Other PBA Implementation Benefits and Challenges

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This chapter evaluates claimed PBA benefits and challenges in areas other than the actual contract award process that were identified in Chapter One and surveyed in Chapter Four through a discussion of our taxonomy and the case studies. These issues, discussed in the following subsections, are as follows:

- Contractor incentives
- Enhanced competition
- Increased civil-military integration (CMI)
- Alternative approaches to cost and pricing data submissions
- TINA legislation and new restrictions on TINA waivers
- FAR Part 12 commercial determinations
- The honoring of long-term contracts by DoD
- The pricing of multiple follow-on production lots
- The pricing of quantity changes
- The pricing of major program modifications
- The pricing of integrated work content
- The flexibility and authority needed by COs and other acquisition managers
- PBA's overall impact on the cost estimating and pricing communities.

Additionally, the discussion here is designed to shed light on the last two of our six key research questions:

5. Is there evidence that additional competitors (at the prime, sub-contractor, or supplier levels), particularly companies that do not normally do business with DoD, have participated in DoD procurements as a result of PBA?
6. Is there documented evidence that the use of PBA has measurably increased contractor incentives to reduce cost through CAIV or other commercial-like incentive mechanisms?

### **Contractor Incentives**

It is extremely difficult to assess and quantify cost savings based on claimed long-term profit incentives provided by PBA to the contractor to reduce prices and costs. Here, recall the argument that under a fixed-price PBA contract, the contractor is much more incentivized to reduce prices as well as costs, because in the long run it will have the opportunity to earn higher profit margins than would be the case under a traditional, CBA contract. Under a CBA contract, DoD pays the actual full cost plus a standard negotiated fee or profit margin for the first production unit and all succeeding production units. This price slowly declines as the contractor moves down the production learning curve, or cost improvement curve.

PBA advocates claim that contractors under PBA are far more motivated to start production at a much lower unit production price (to win the competition, for example) and then work much harder to reduce production costs as procurement continues under prenegotiated prices. Such advocates claim that contractors under PBA will behave like firms in the civil commercial market at the beginning of a program, offering DoD an initial production unit price that may be below the actual initial unit production costs, and then work hard to cut their production costs. They seek to gain market share by offering a low initial unit production price, knowing that despite that low initial price, they have a long production run over which to further reduce costs while retaining all the savings. In other words, using a commercial-style business strategy, the contractor assumes that at some point the unit production costs will fall below the contractually

negotiated price. The contractor is motivated to continue reducing production costs both to make up for early production run losses and to retain ever-increasing percentages of the fixed production price as profit. In the end, the contractor is motivated by the chance to make profits over the entire program that are higher than those normally accepted under traditional, CBA contracts.

According to the PBA advocates, this scenario is of immense benefit to DoD in two ways. First, the contractor is motivated to offer a far lower initial production price in order to win in a competitive situation (or to gain market access), and it accepts the risk of reducing its own production costs, knowing that it will be able to retain all the savings on a dollar-for-dollar basis. After the contractor “crosses the line” into profitability, it will continue to reduce costs to increase its profits, all of which it can retain under PBA. And at least some of those savings, PBA advocates argue, will ultimately be shared with DoD when follow-on contracts are negotiated. PBA advocates argue that the contractor’s interest in gaining and expanding market share, and the pressures of direct and indirect competition, will encourage the contractor to share cost savings with DoD. Second, even if contractors do not share later production savings with DoD, they will have become inherently more efficient and will ultimately share the resultant savings with DoD in the course of future programs in which they are involved, as long as the programs are conducted in a competitive procurement.

It is almost certain that at least in some of the cases we examined, PBA motivated contractors to offer initial unit production prices considerably below the anticipated initial unit production costs, and that those contractors were strongly motivated to reduce their costs as production continued. The central related issue of interest to the DoD acquisition community, however, is whether the total area “under the price/quantity curve” in PBA is less or more than it would have been in a CBA. In other words, after the total acquisition is complete, has DoD paid more or less in total hardware procurement costs than it would have under CBA?

The PBA advocates’ response to this question is that it misses the point. They claim that PBA, if implemented properly, will always

result in DoD's buying a product at a desirable average unit procurement price that provides good value. How much profit the contractor makes overall is totally irrelevant to them. Furthermore, they generally insist that the price under PBA almost always will be less than it would be under CBA. What we found is that there is virtually no way to prove or disprove this contention based on existing case studies or available data.

The argument advanced by PBA advocates causes some unease among DoD contracting officials because of the structural differences between the commercial and military markets, particularly the military market's relative lack of competition in many product segments. Based on our review of the case studies, it appears that DoD has on occasion become, in practice, effectively locked into sole-source non-competitive PBA-like programs. In certain circumstances, the costs of switching systems or suppliers become prohibitive, or political or bureaucratic realities effectively limit choice. In such cases, if there are few or no contractor cost data available, DoD has a limited ability to determine the degree to which the contractor is providing good price value and/or is sharing cost savings with DoD. And the contractor in such circumstances may be tempted to retain all or most of its cost savings as additional profit. The argument of some reform advocates that a price found acceptable by the buying authority translates into DoD achieving good value does not appear to be totally compelling to DoD officials who have a fiduciary responsibility to the taxpayer.

However, if DoD contracting officials are concerned about price gouging in such circumstances, they always have the option (except in the case of FAR Part 12 commercial determinations) of invoking a requirement for contractor cost or pricing data in follow-on production lots in order to make a determination of a fair and reasonable price.<sup>1</sup>

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<sup>1</sup> Even in the case of FAR Part 12 determinations, a revised determination can be sought under the appropriate circumstances, and the program can be changed to FAR Part 15 rules.

## Enhanced Competition

Of the case studies we examined, many—though certainly not all—clearly resulted either in the procurement of an item at an initial and follow-on production price lower than originally anticipated or estimated (such as JDAM and JASSM), or in a price that was reduced compared with earlier prices for the same item (such as AMRAAM and the C-17). But as noted above, all of these cases suffer from an analytical difficulty: the problem of how to disentangle a variety of interdependent causal factors, some related to acquisition reform and PBA, and some not. A common theme runs through almost all the cases, however, and that is the central role of competition.

In many of the cases, such as JDAM, JASSM, and the C-17 MYP I, direct competition appears to have played a critical role in incentivizing contractors to reduce prices. Indirect competition or the threat of substitution seems to have beneficially affected others, such as AMRAAM lots 16–21 and C-17 MYP II. PBA-like cases in which competition was less in evidence appear to have produced less satisfactory results in terms of likely reductions in price—for example, the Air Force C-130J MYP and the T-6A Texan lots 9–13.

Nearly all authorities agree that PBA works far better with more competition than with less. Perhaps more interesting, however, is the question of how important PBA is in achieving the claimed cost-reduction benefits associated with competition. It could be argued that even with an acquisition approach that moves down the continuum toward CBA, most of the same price benefits could still be achieved through the vigorous application of competition combined with CAIV, strict production price thresholds and goals, and various mechanisms that permit the contractor to “share in savings” if it reduces costs during production.

And it is certainly arguable that in a situation with minimal competitive pressures or other price-reducing market mechanisms, DoD COs are well advised to avoid the end of the continuum that approaches “pure” PBA. If a single contractor provides a complex, unique, proprietary military product with no commercial uses and no available direct substitutes, PBA does not appear to be the optimal

acquisition strategy. With little or no insight into contractor costs, and no comparable competing items available, a contractor under a PBA contract in these circumstances would be in a strong position during price negotiations with DoD. This, of course, is no great revelation. DoD's 1999 PBA Study Group Report recommended against the use of "pure" forms of PBA in such circumstances.

In short, we found no decisive, quantifiable evidence that clearly attributes cost or schedule savings for an overall procurement (as opposed to a few initial production lots) solely or even primarily to alleged PBA-provided contractor incentives to reduce prices for the sake of gaining market share or retaining greater profits later during production.<sup>2</sup> However, it does appear to be intuitively plausible that PBA-like approaches—when combined with competition and implemented in a CAIV environment using strict production price goals and thresholds along with mechanisms that allow the contractor to "share in savings"—may lead to reduced prices for DoD. But we also must note that in promoting positive cost outcomes, PBA may be less important than all the contributing factors mentioned here, such as competition and "share in savings" mechanisms, neither of which appears to require the use of PBA.

## Increased Civil-Military Integration

Recall that advocates of PBA argue that it encourages CMI, which in turn promotes reduced costs through two mechanisms: (1) by encouraging greater numbers of civilian commercial firms to compete

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<sup>2</sup> PBA critics sometimes label the "market share" argument as a risky low-ball "buy-in" strategy. They assert that under both PBA and CBA, contractors may offer unrealistically low initial prices to win a contract. These critics would argue that buy-in proposals are much easier to detect under CBA than PBA, because government cost analysts can carefully review all the contractor's cost inputs in the proposal on which the price is based. Reform advocates counter that buy-in is impossible under PBA because the contractor agrees to accept the risk and deliver at a fixed price no matter what its costs are. Opponents retort that PBA approaches found in aspects of programs such as JASSM and JPATS demonstrate that PBA merely formalizes buy-ins while permitting large price increases later in the production programs.



for military-unique DoD contracts, thus encouraging greater price competition, and (2) by increasing DoD access to advanced civilian commercial technologies and processes, as well as to NDIs.

The extensive interviews we conducted with industry and DoD experts (see Chapters Three and Four) failed to identify any quantifiable evidence of cost savings clearly attributable to these CMI factors stemming from the use of PBA. Indeed, only in a very few isolated cases were officials able to identify specific vendors that allegedly would not have participated in DoD programs if CBA regulations had been imposed. Our review of the case studies (Chapter Four) suggests that even in the very early competitive phases of PBA programs, even on less-complex, more “commercial-like” military-unique items such as JDAM, PBA attracted virtually no nontraditional civilian commercial contractors to compete for DoD prime contracts. This is clearly because the special design, engineering, and integration skills required to develop and produce military-unique equipment are in most cases possessed almost exclusively by contractors that routinely do business with DoD. Thus, even such programs as JDAM, WCMD, and DAGR (Defense Advanced Global Positioning System Receiver)—all of which depended partly on GPS technologies with major dual-use civil-military applications and used innovative forms of PBA—attracted only defense-oriented companies as serious competitors for the prime contract.

The same is true for the most part even on the second-tier level of vendors and suppliers. Early on in the JDAM program, when Boeing (then McDonnell Douglas) and Lockheed began competing for the final downselect, a large percentage of the major components of both competing primes’ designs were expected to be provided by civilian commercial vendors. For example, the original Boeing design anticipated using a mission computer derived from an item supplied by a civilian commercial vendor. By the time the winning Boeing design was finalized, the prime contractor decided to source the mission computer from a more traditional military vendor. This was also true of the inertial measurement unit, GPS receiver, power supply/distributor, and other important components. All these items, which together make up the bulk of the JDAM system’s cost, ended up

being sourced to traditional military vendors, despite the regulatory relief the program enjoyed from traditional, CBA reporting and oversight requirements. There is no solid indication that PBA provided DoD access to critical commercial vendors, components, or technologies that would have been denied under a CBA contract.

Some former JASSM program officials claimed that at least two important nontraditional civilian commercial vendors, crucial for providing important airframe structures, would not have participated in the program without an informal waiver of traditional, CBA cost reporting requirements. We were unable to convincingly confirm or disprove this assertion. Whether or not it is true, however, some observers expect at least one of the vendors in question to be acquired prior to production by a major contractor specializing in military-unique equipment. Furthermore, the vast majority of vendors on JASSM are traditional military suppliers (Lorell et al., 2000).

One of the two companies most often cited in open sources on the JASSM program as a prime example of CMI promoted by PBA is Foam Matrix, Inc., of Inglewood, California. Yet a quick glance at this company's position raises possible questions about the validity of citing this company as such an example. Foam Matrix apparently emerged from a predecessor firm called Fiber Foam, which was founded in 1985 to develop new composite technologies for surfboards, sailboards, and other commercial sporting goods. However, once a relationship was developed with Lockheed Martin Skunk Works (and later with Boeing on the Pegasus UCAV program) to leverage Fiber Foam's capabilities for military aerospace applications, a new firm, Foam Matrix, was spun off from Fiber Foam. Considerable additional development was then undertaken in a military R&D environment. It is unclear how close the original Fiber Foam technologies and approaches are to what Foam Matrix intends to apply to the JASSM program. What is clear is that 100 percent of Foam Matrix business was always military work. According to a recent official DoD report (Office of the Deputy Under Secretary of Defense [Industrial Policy], 2003), there are no current civilian commercial

applications whatsoever for any Foam Matrix processes or products.<sup>3</sup> While no one doubts Foam Matrix's success and innovativeness, its claimed status as a prime example of a dual-use supplier using commercially developed civilian technologies that was attracted to JASSM only because of the regulatory relief provided by PBA is certainly not above challenge.

It is true that the R&D programs for these systems on the prime-contractor level were structured essentially as traditional cost-plus contracts. As such, DoD did collect price and cost data from the prime contractors; and in some cases, DoD had insight into cost and price data from lower-tier suppliers during R&D. Some reform advocates argue that had the R&D phases been conducted in a more PBA-like manner, more nontraditional second-tier civilian commercial vendors might have been attracted. However, none but the most radical acquisition reformers argue for full application of PBA to R&D programs for the development of complex, military-unique items. Indeed, small innovative suppliers such as Foam Matrix have made it clear to DoD that they do not possess the financial resources to conduct the scale of R&D required to qualify their products for new military-unique programs. The stated strategy of Foam Matrix is to team closely with military prime contractors, such as Lockheed and Boeing, to gain access to DoD funding for R&D efforts. That funding, with few exceptions, is provided on a CBA basis.

## **Alternative Approaches to Cost and Pricing Data Submissions**

Most major DoD contracts for complex military-unique noncommercial items, even when procured in a more PBA-like environment,

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<sup>3</sup> There are some sources claiming that the successor company to Foam Matrix on the JASSM program will not participate in the production effort because the program is returning to a traditional, CBA structure. However, it does not appear that a significant percentage by value of the technology or components planned for the production versions of JASSM can be considered to have originated from the commercial sector. Most suppliers appear to be primarily military suppliers.

do (and should) require some contractor cost data. There are numerous options for providing DoD with less than fully TINA compliant certified cost or pricing data that appear to impose little burden on the contractor and might lead to many of the claimed benefits of PBA.

Both our interviews with DoD and industry experts and our review of the case studies showed that most sole-source and even many competitive DoD contracts for complex military-unique items required contractors to provide at least some cost data, even when the procurement took place in a PBA-like environment. This seems perfectly reasonable and, indeed, prudent given the unique structure of many sectors of the defense market, which tends toward monopsony-monopoly or duopoly relationships, and the parallel practices in various similarly structured civilian commercial market sectors. In both civilian and military specialized markets where there are few suppliers of one-of-a-kind products (and those products often require major developmental expenditures), contractors routinely share at least some cost data with buyers. Prime contractors in the civilian commercial world often work closely with suppliers of low-volume, high-cost items to help them reduce costs, and these suppliers often provide the prime contractor with cost data as part of the cost-reduction effort. This is typical in the civil transport market, for example; it was also the case in many recent PBA-like DoD pilot programs, such as JDAM.

The key difference between traditional, CBA programs and many PBA-like programs is more often found not in whether cost and price data are provided, but in the quantity, breadth, level of detail, and format of the cost data provided by the contractor in each type of program. Perhaps most important, the PBA-like programs we looked at did not require TINA certified cost data in proposals, and thus freed the contractor from many of the burdensome accounting and legal liabilities that the requirement to provide TINA compliant cost data imposes.

As noted in Chapter Three, most defense contractors (and many civilian commercial vendors) are not opposed to providing to the prime contractor or buyer some high-level cost data in their own

company format. Furthermore, the provision of such cost data rarely imposes cost or schedule penalties on the contractor. Virtually all defense contractors already have DoD compliant accounting and cost tracking systems in place, which they use for internal company management of programs and for developing business cases and strategies. What contractors typically object to is providing TINA certified cost data, because doing so exposes them to legal claims of defective pricing and the likelihood of audits. They also generally object to CCDRs as unnecessary and bureaucratically burdensome. But our interviews and case-study analysis identified little opposition on the part of contractors to providing uncertified high-level cost data in their own format.

Nor did contractors believe that the provision of these data imposed significant cost, schedule, or workload penalties on them. Furthermore, since our research suggests that the vast majority of prime contractors and principal lower-tier vendors involved in DoD military-unique procurements already specialize primarily in DoD military contracts, providing cost data to DoD does not appear to be the major problem that many acquisition reform advocates suggest.

The case studies we examined indicate that the options for providing cost data to DoD range from pure CBA (i.e., in full compliance with TINA) to pure PBA. One innovative approach developed jointly by DoD and contractors is the use of Joint Price Models (JPMs), which are price/cost models derived through DoD/industry discussions and based on high-level historical cost or pricing data. Model parameters are developed jointly through consensus, and new contractor data and parameters are constantly input to keep the models updated. Although these models do not match the enormous complexity and the rigorous cost buildup and certification standards of traditional, CBA approaches, they have proven useful in programs with long production histories and close relationships between the program office and the contractor. Program offices have successfully used them to reduce workload and schedule in evaluating new production lot proposal prices for fairness and reasonableness. Examples of programs that have used this approach are AMRAAM and the C-17, as discussed in Chapter Four.

Some of the programs examined in Chapter Four provided virtually no cost data of any type to DoD during all or part of the production phase. These were programs whose initial price had been set through competition during development (such as JDAM, WCMD, and JASSM) or that had received a commercial FAR Part 12 determination (such as C-130J and T-6A Texan II). Even among the first of these two groups of programs, DoD had collected considerable quantities of cost or pricing data during the development phase, which had involved the manufacture of many test vehicles, including some that were production representative that supported developmental and operational testing and evaluation. These data permitted DoD cost analysts to calculate plausible production costs for the initial production item and to project future unit costs through the development of a cost improvement curve. In the case of the second group, a significant amount of historical cost data from earlier lots of the same or similar aircraft was available. In addition, the prices of analogous aircraft were examined. However, some DoD officials have expressed concerns with the approaches adopted in both groups of programs, as is discussed below.

Finally, it is important to keep in mind that any FAR Part 15 program that because of competition or waiver is not required to provide certified cost or pricing data can be required to do so at any time later in the program if the CO deems the data necessary for making a fair and reasonable price determination. Contractors often claim that it is very expensive to provide cost data, but it is our view that DoD officials should remain skeptical of such claims. The cost of providing basic, noncertified cost or pricing data should be modest, since most contractors gather the data themselves for their internal business cases. In our view, it is not the basic data that drive cost; it is the format, level of detail, certification, and follow-on clarifications. The process for requiring cost or pricing data is more difficult, however, for programs that have received a FAR Part 12 commercial determination, since the determination has to be reversed first.

## TINA Legislation and New Restrictions on TINA Waivers

TINA waivers for programs with recent certified cost or pricing data are often useful, but action is required to clarify recent legislation that may effectively prohibit further use of these waivers in this area. Our interviews with experts and our examination of the case studies indicate that one of the most obvious low-risk areas for the use of PBA based on TINA waivers is follow-on production lots of items with a recent history of certified cost or pricing data. Good examples of this use of PBA are various F-16 follow-on production lots. Workload and schedule benefits clearly can be achieved, although they are usually relatively modest. In addition, these are among the few cases in which we and others were able to credibly identify real cost savings stemming from the avoidance of production gaps that was made possible by rapid award of new production contracts facilitated by TINA waivers. Good examples of this can be found with the Predator and the B-1B Towed Decoy System programs.<sup>4</sup>

However, late in the Clinton administration, some members of Congress raised concerns about what they viewed as DoD's increasingly broad and lax application of its statutory authority to grant TINA waivers. Critics argued that DoD was granting too many TINA waivers and pointed out that federal regulations state that waivers should be granted only in "exceptional cases."<sup>5</sup> In 1998, DoD was directed to clarify guidance for the application of TINA waivers (U.S. House of Representatives, 1998). DoD did not issue new guidance, however.

In 2000, Congress tasked the DoD's Office of the Inspector General to conduct audits of DoD's recent use of the TINA waiver provision. These audits resulted in two reports that were generally critical of DoD's use of its TINA waiver authority and that alleged that DoD had paid inflated prices in many cases because of its inap-

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<sup>4</sup> As noted in Chapter Four, savings on the Predator program due to TINA waivers are documented in U.S. General Accounting Office, 2002.

<sup>5</sup> FAR Part 15.403-1 defines exceptional cases as all TINA exceptions based on grounds other than adequate competition or on a commercial FAR Part 12 determination.

appropriate use of TINA waivers. The uniformed Services generally did not concur with these findings and offered differing interpretations of most cases (Office of the Inspector General, Department of Defense, 2001a,b). In 2002, the Senate Committee on Armed Services tasked the U.S. General Accounting Office (GAO) to also examine DoD's use of TINA waivers. The resulting GAO report concluded that DoD needed to develop improved guidance for the determination of TINA waivers (U.S. General Accounting Office, 2002).

In response, the Senate crafted an amendment (Section 812) to the National Defense Authorization Act for FY 2003 that imposed strict new guidelines for granting TINA waivers. This amendment was later modified during the House-Senate conference session, resulting in a final set of revised guidelines published under Section 817 of the Act (U.S. House of Representatives, 2002). In a memorandum to the Service acquisition contracting directorates dated 11 February 2003, the DoD Director, Defense Procurement and Acquisition Policy, promulgated the guidelines established in Section 817 as formal DoD contracting policy (Lee, 2003).

The new guidelines mandate that three conditions must all be met in order to grant a TINA waiver in "exceptional cases" (in other words, for all sole-source noncommercial acquisitions exceeding \$550,000). The three conditions that must be met are:

- The item or service "cannot reasonably be obtained" without granting the exception or waiver,
- The price can be determined to be fair and reasonable without certified cost or pricing data, and
- There are demonstrated benefits to granting the exception or waiver.

In addition, the guidance requires that annual reports to Congress be prepared on all exceptional-case TINA waivers and commercial item determinations in excess of \$15 million, and that the reports fully explain the basis of the determination and the steps taken to determine that the price was fair and reasonable.



In our interviews, we learned that when the February 2003 DoD memorandum was promulgated, there was wide consensus among DoD and industry COs that the new guidance would effectively eliminate almost all of the most common and widely supported uses of TINA waivers for sole-source noncommercial acquisitions. This pessimistic view was based largely on the first of the three conditions in the new guidelines.

Most observers noted that virtually all prime contractors involved in military-unique acquisition programs are experienced defense contractors that have operated for years using DoD compliant cost reporting and accounting systems and thus could reasonably be expected to provide certified cost or pricing data at any time if asked. An opposing opinion was that because the original language had been softened in the revised version of the amendment by adding the word *reasonably* to the phrase *cannot be obtained*, the door had been left open a bit for continued use of the “exceptional case” TINA waiver with traditional defense contractors. However, this was a distinctly minority opinion.

Most DoD COs and other experts viewed the new guidance as allowing the exceptional-case use of TINA waivers only when the item or service literally could not be obtained without a waiver, a situation that clearly would not apply to any traditional defense contractor or to the vast majority of cases in which such waivers had been granted in the past.<sup>6</sup>

We recommend that the guidance on what constitutes an “exceptional case” be clarified further and revised to clearly permit the use of waivers in cases where there is broad consensus among DoD and industry contracting officials that the waivers are useful, such as for follow-on buys when a long history of cost or pricing data is already available.<sup>7</sup>

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<sup>6</sup> Months after the issuance of the new DoD guidance, experts in the field were still debating whether the new guidance meant “the death of waivers.” See, for example, Rumbaugh, 2003.

<sup>7</sup> According to a report of the Acquisition Reform Working Group (2004) representing U.S. industry, this legislation has had the following negative results: “The number of (TINA)

## FAR Part 12 Commercial Determination

FAR Part 12 commercial determinations from senior acquisition officials for large sole-source military-unique systems, even if those systems are offered to non-government customers, can be problematic. DoD should consider issuing more-precise guidelines for commercial determinations in such circumstances. As touched on in Chapter Four, interviews with DoD working-level experts and our review of several case studies suggest that the granting of FAR Part 12 commercial determinations for some large sole-source military-unique systems is sometimes questionable.

The 1990s witnessed major changes in the regulations for making commercial determinations that relieve the contractor from having to provide DoD with cost or pricing data. TINA exceptions and waivers were available for commercial catalog and market prices based on market acceptance prior to FASA. However, to qualify for a commercial price exception, there had to be proof that an item or service had been sold in “substantial quantities to the general public.”<sup>8</sup> A “percentage of sales” test was used to define “substantial”: If DoD made up less than 50 percent of the total market for an item, the item could be considered commercial.

The problem here is that for many items, the differences between DoD and commercial purchasing approaches can cause clearly civilian commercial items to fail the percentage-of-sales test. For example, the Air Force operates lightly modified variants of civilian commercial business jets for liaison and other routine duties. The original equipment manufacturer (OEM) typically stocks the spares for commercial owners of business jets, but the Air Force may choose to organically support its business jets and thus may purchase a large stock of spares from the OEM in a single year. As a result, DoD might appear in that one year to comprise more than 50 percent of

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waivers granted has been severely reduced even in repetitive follow-on buys, where there is little value in the detailed, traditional full TINA coverage.”

<sup>8</sup> See United States Code Service, Title 10 USCS § 2306a *Cost or Pricing Data (b) Exceptions*, 1993.

the market for a wide variety of spares, thus making those spares ineligible for a commercial determination the next year, even though they are indisputably civilian commercial.

FASA and FARA were in part intended to solve this problem by eliminating the percentage test. This legislation and other measures led to a redefinition of commercial items that not only removed the requirement for proof of an item's sales to the general public, but also ended the use of actual civilian commercial market sales to prove market acceptance and price reasonableness. Perhaps most important, the definition of a commercial item was dramatically broadened to apply to any item "of a type customarily used by the general public or by non-governmental entities," any item that evolved from such an item, or a modification of such an item. Now, instead of having to show actual sales of the item to the general public or to non-governmental entities, one need only show that the item had been "offered for sale, lease, or license to the general public," or developed with private money and sold in substantial quantities to state and local governments.<sup>9</sup>

This new and very broad definition of commercial items made it possible to designate as commercial a broad range of items that under normal conditions of public discourse would be considered unique to the military. For example, the new regulations and definitions made it possible for specialized military transport aircraft that have never been sold to non-military customers (for example, the C-130J) to be designated as commercial items. Such items qualified because they had theoretically been offered for sale to commercial nongovernmental customers (and in the case of the C-130J had been developed using company funds).

As pointed out earlier, the underlying rationale for waiving the requirement for cost or pricing data for commercial items is that normal commercial market forces establish fair and reasonable prices for truly civilian commercial items. However, under the current broad definition of commercial items, goods that are normally

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<sup>9</sup> See FAR Part 2.101(1) through (8).

thought of as military unique and, perhaps more important, that may have no direct competitors and no established commercial market may receive a commercial determination and thus are not subject to the requirement to provide cost or pricing data.

Numerous working-level officials we interviewed had serious doubts about the ability to determine fair and reasonable prices in such circumstances. It is our recommendation that DoD re-examine the current, very broad definition of commercial items and provide to COs in the field more guidance on granting commercial determinations in cases involving items not routinely sold to the general public or nongovernmental entities.<sup>10</sup>

## **Honoring of Long-Term Contracts by DoD**

To remain credible and to continue interacting in a constructive way with contractors on PBA-type programs, DoD must honor the terms of agreements negotiated in good faith that establish long-term AUPP commitments. Several of the most innovative and radical PBA-like programs we examined included various forms of long-term average procurement price commitments by the contractor. Contractors on these programs (JDAM, WCMD, and JASSM) were usually in a competitive environment during R&D and committed to maintaining an AUPP over a very long production run. These commitments were not rigidly contractually binding. Instead, they were based on an agreed series of “carrots and sticks” that DoD could use to encourage the contractor to meet the overall average procurement price commitment when actual specific production lot contract prices were being negotiated.

In several of these programs, contractors have made commercial-style bids, in which early production lots are priced below actual production costs in anticipation of larger profits in later production lots

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<sup>10</sup> The fact that Section 817 of the FY 2003 National Defense Authorization Act (discussed earlier) requires annual reports to Congress that include complete justification for large commercial determinations may encourage the issuance of such guidance.

as average unit production costs decline more quickly than the pre-negotiated average procurement price. In some of these cases, the contractor has accepted considerable financial risk up front in the program, the expectation being that it can make more profit later in the program.

In one or two cases, DoD officials have considered the option of returning to a CBA after completion of the initial production lots. If such an action were taken, it would prevent the contractor from achieving a higher profit level on later production lots to compensate for losses on early production lots. DoD's adoption of such an action is fundamentally in conflict with the principles of PBA and would act to discourage contractors from participating in PBA-like programs in the future. It would be a violation of the basic agreements and the trust painstakingly developed between DoD buyers and contractors on PBA pilot programs and would contribute to a return to old-style, nonproductive adversarial relationships.<sup>11</sup>

PBA is definitely not appropriate in all or even most circumstances on major sole-source military-unique acquisition programs. But when it has been selected and implemented, and contractors have carried out their obligations in good faith, DoD would be well served to also honor its obligations to the contractor. Thus, if a contractor on a PBA program is in good faith remaining within the parameters of the pre-agreed AUPP over an agreed range of production units, DoD should refrain from reimposing CBA requirements or other "sticks." If DoD contracting authorities believe the contractor is achieving inappropriately high levels of profit margins, then, once the initial production agreements have run their course, they need to bargain fiercely or ask for cost or pricing data on the next series of procurement lot price negotiations.

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<sup>11</sup> In the cases of WCMD and JASSM, the government has returned or apparently will return to full TINA compliant CBA.

## Pricing of Multiple Follow-On Production Lots

The pricing of multiple follow-on production lots without the clear option of obtaining updated cost or pricing data from the contractor raises major challenges for DoD COs. This issue is in some respects the reverse side of the coin with respect to the previous issue. Some PBA-type contracts establish or at least anticipate specific prices stretching far out into the future through multiple production lots. Most of these contracts, however, have clear mechanisms whereby COs may require certified cost or pricing data if they think them necessary or if certain conditions are not met. Some COs expressed the belief that they were constrained in seeking this remedy, particularly with respect to certain sole-source military-unique systems that had received a FAR Part 12 commercial determination, or certain follow-on production lots that had been treated as add-ons to existing contracts that had received a TINA waiver.

In most cases that fit these categories, contractor-supplied cost or pricing data, whether certified or not, were available for the identical or a similar item at the time a commercial determination was made or the TINA waiver was granted. By adjusting these data for recent changes and economic conditions, the CO could fairly easily and confidently make a fair and reasonable determination of price for the new production lot. However, as time passes, the cost or pricing data from early production lots become increasingly dated, and their reliability and applicability to new follow-on production lots decline. This challenge makes it increasingly difficult for the CO to make a fair and reasonable determination of price. If a new production lot is treated as a contract add-on, and the original contract included a TINA waiver, then no additional cost or pricing data can be required from the contractor. DoD should consider revisions or further guidance in such situations.

## Pricing of Quantity Changes

Large quantity changes not anticipated in procurement price agreements raise pricing challenges for COs. In recognition of how unpredictable the congressional and DoD budgeting process can be, most sophisticated PBA-like LTPAs and long-term procurement price commitment agreements for specific production lots include prenegotiated prices or bands for widely differing procurement quantities. In at least two cases we examined, however, procurement quantities fell outside the parameters of the production price agreements, resulting in some new challenges for COs.

In one case, quantities remained near the low end of the band for several lots and then fell below the minimum. Although the SPO attempted to make adjustments and continue with a PBA-type approach, the reduction in anticipated quantities was so great that this proved impossible. There was no way to determine a fair and reasonable price at such reduced quantities. It is interesting to note that the contractor appears to have favored dropping PBA at this point in order to eliminate the restrictions placed on raising the unit price imposed by the procurement price commitment agreement. As a result, the SPO required the contractor to supply certified cost or pricing data, and the unit price of the item increased substantially.

In the JDAM case, the production lot quantities vastly exceeded the upward bounds of the anticipated production numbers. Some DoD officials argued that prices should be renegotiated down considerably to reflect unanticipated new economies of scale. The contractor countered that the additional capital investment and other adjustments required to meet the large unanticipated increase in demand could justify the same price that DoD was currently paying or an even higher one.

In the end, the JDAM unit procurement price (in constant dollars) essentially remained the same in spite of the huge increase in total procurement numbers. Supporters of this deal argued that DoD was getting an excellent weapon system in greatly increased numbers at a very reasonable price. Some COs and other DoD officials remained uneasy, however, because the complete lack of contractor

cost data and the dearth of comparable items on the market to use for price comparisons made it impossible to estimate the contractor's true costs and profits.

In spite of the PBA advocates' argument that contractor profit margins should be of no concern to DoD as long as the user believes it is receiving good value for its money, common sense clearly dictates that DoD needs to eventually revisit LTPAs on items whose production runs become much larger and longer than originally anticipated. If no directly competing items are available for price comparison in such cases, then contractor cost or pricing data in some form need to be examined.

## **Pricing of Major Program Modifications**

Another issue that can be problematic is the pricing of nonrecurring development and new production prices for significantly modified new variants of items covered by LTPAs. This issue presented challenges in several of the PBA-like cases we examined. In most cases, traditional cost-plus contracts with certified cost or pricing data were negotiated to cover the nonrecurring costs for the development of the modification. A baseline price derived from the prior agreed-upon price of the premodified item's unit price was developed, and then DoD and the contractor negotiated a premium to add on to the baseline recurring price to arrive at a new, higher price for the unit procurement price of the upgraded modified item. This price was derived in part from the cost or pricing data collected by DoD during the nonrecurring development phase.

In one case, DoD collected no cost or pricing data for either the nonrecurring development phase or the new recurring production cost, since the price of the new variant was deemed to have been established as fair and reasonable by a competition against other, similar items. Although this finding was accepted by senior DoD acquisition leadership, some COs were uneasy about it at the time. They have remained uneasy about the whole issue of negotiating LTPAs based on an original technical competition and subsequently



having to price significant modifications and upgraded versions of sole-source military-unique items without obtaining new cost or pricing data. Clearly there have been instances in which, depending on the magnitude and scale of the modification, as well as the structure of the market, DoD would have been better served to require more-extensive cost or pricing data in such circumstances.

## **Pricing of Integrated Work Content**

Experience suggests that it is important to carefully assess and include the costs of spare parts, peripherals, and weapon system support when negotiating prices on PBA-like procurement contracts. We identified several cases in which acquisition managers noted in retrospect that, during price negotiations, too much attention had been paid to the price of the specific piece of hardware being procured, and not enough to the price of peripherals and support. These officials strongly argued that to be fully successful, PBA-like programs should take the type of approach suggested by the concept of Total System Performance Responsibility (TSPR), and that the final price negotiated must include contractor responsibility for system life-cycle management. This is particularly true when sole-source military-unique items have received commercial FAR Part 12 determinations.

The concern here is that in the absence of a TSPR approach, and in situations where DoD cannot require cost or pricing data, the contractor will be able to “low-ball” the basic system hardware price and later pursue pricing policies in the areas of services, support, and spare parts that the user will find much less attractive. (This is, of course, standard practice in the commercial world in areas as diverse as automobiles and desktop printers.) As a result, the life-cycle cost or total ownership cost of the item procured under PBA could end up being higher than DoD originally expected. On the other hand, several PBA-like programs we examined were essentially established and priced from the beginning as being fully in line with TSPR concepts, and appear to have worked well.

## **Flexibility and Authority Needed by COs and Other Acquisition Managers**

COs and other acquisition managers need flexibility and authority to effectively implement PBA concepts. Many COs and other acquisition personnel argued that DoD officials who are directly involved in program management and must take responsibility for certifying price reasonableness need more flexibility and authority if they are to effectively implement PBA. In some cases we examined, senior officials imposed forms of PBA from above on programs that might have been more appropriately served by other, more-moderate forms. This was particularly seen as the case in some examples of commercial determinations for sole-source military-unique products. In other cases, some COs believed the effective use of PBA in appropriate circumstances was constrained by concerns about auditors later second-guessing rationales and justifications on price reasonableness when decisions were made without certified cost or pricing data.

In the second example, the problem may be more an issue of the decision process's level of documentation than an issue of judgment errors. Nonetheless, the basic point remains. Many COs and other acquisition managers believe that officials directly involved in programs must be granted greater flexibility and authority to implement PBA. This is particularly true regarding the requirement for cost data. Too often in the past, a strict differentiation has been established between CBA and PBA. As the authors of the PBA Study Group Report recognized, however, a continuum of PBA-like solutions can be applied to programs to fit the specific circumstances. Acquisition managers on the program level need the flexibility to tailor the requirements for contractor-provided cost or pricing data, whether those data are certified or not. In sole-source military-unique acquisitions, some cost data from the contractor may nearly always be appropriate, but there is a vast middle area between fully certified cost or pricing data in a formal TINA format, and no cost or pricing data at all. As the commercial sector learned long ago, requiring selected types of cost data in contractor format from certain vendors can sup-

port a more productive team approach to reducing overall costs and producing a better product.

## **PBA's Overall Impact on Cost Estimating and Pricing Communities**

Finally, the issue of PBA's effect on the cost and price analysts within DoD has to be addressed. Based on our discussion of the theoretical cost savings in Chapter Two and the observations of DoD and contractor officials in Chapter Three, it appears that little adjustment to standard cost estimating approaches for process savings/cost avoidance from use of PBA versus CBA procedures is warranted, since proposal costs are a small percentage of the overall contract value. In addition, as part of a milestone estimate, cost estimators have to produce estimates of DoD costs, such as SPO costs, testing costs, DoD furnished materials, etc., which would experience little difference whether PBA or CBA procedures were used.

As discussed above, reform advocates claim that the use of PBA will produce major procurement cost savings because (1) it will promote enhanced competition and (2) it will motivate contractors to dramatically lower prices as a way to gain market share and because they will anticipate higher profits during later stages of production programs. As stated earlier, we found no hard evidence that decisively supports or discredits these claims. Therefore, it is not possible to provide general guidance to cost estimators on how to factor such claimed savings into their cost estimates.

We did find numerous situations, however, in which the procurement prices offered by contractors for early production lots were considerably below the cost estimates developed by DoD cost estimators based on cost or pricing data from the related development stage or from analogous programs. In the JASSM case, cost estimators were concerned that the contractor's prices were so far below the actual estimated recurring costs that they threatened the program's stability and could lead to the withdrawal or bankruptcy of important subcontractors. This did not happen, however. As a strategy to win the com-

petition, the prime and the subcontractors were apparently willing to accept losses during the early production lots because they anticipated having higher profit margins during later production lots. It is not clear how cost estimators should respond to similar situations in the future other than to affirm that DoD is receiving a price benefit through the use of PBA, at least during the early production lots (assuming the prime contractor continues to adhere to the procurement price agreement even if experiencing losses during initial production lots).

The other effects that PBA has on the cost estimation community will vary depending on where the estimators are. Those assigned or attached to a SPO will still have to develop estimates for source selection activities, for which some modicum of uncertified cost data will certainly be requested from contractors even in a competitive downselect. If the acquisition strategy includes a procurement price commitment as part of the development proposal, SPO workload will be higher initially, since development and production costs will have to be evaluated; but it should be reduced for follow-on production lots, even including a Milestone C cost estimate. Presumably the SPO would use the procurement price commitments (adjusted for known program changes) made as part of the development proposal as the basis for its estimates. It would still have to estimate DoD costs as part of its Milestone C estimate.

Also, as discussed above, SPO estimators will face challenges properly estimating the costs of engineering change orders (ECOs) in both development and production. Given that few cost data will be reported after production contract award, contractors may have to submit cost data for the proposed ECOs (a practice we found in many SPOs). But there is still the issue of what the baseline cost estimates should be, especially if the ECO involves replacing one piece of hardware with another, newer one. Determining the amount by which to reduce the baseline for the old program content, which was based on higher-level cost data or just an overall unit price, would presumably be more difficult than determining the cost of the new equipment to be added, for which the estimators would have cost data.

The impact on independent cost estimators (such as the OSD Cost Analysis Improvement Group or the Air Force Cost Analysis Agency) may be different, depending on the philosophy driving their reviews. Their job may be more difficult under PBA rather than CBA because of the lack of actual cost data reported during early production under PBA. Senior leaders of these organizations are often unwilling to accept proposal estimates from contractors without some level of independent verification. Under PBA, a contractor could legitimately refuse to cooperate with the independent analysts' efforts to gather cost data, especially if the contractor claims that its estimates include savings associated with *not* having to report costs to DoD. These situations would require negotiations with the contractor to determine what was within the scope of the contract versus what would be viewed as additional effort and therefore could be added as a separate CLIN to the existing contract (with undoubtedly a large price tag). Another possibility here would be for the independent estimators to base their estimates on other methodological approaches, such as the use of actual data from other, similar programs or the use of parametric analysis.

All of this points to what is probably PBA's most important effect on cost estimators: the loss of contractor-reported cost data. The general philosophy under PBA, of course, is to reduce reporting to save costs. With little or no reporting of costs (for example, with the elimination of the CCDRs), one might ask where estimators will obtain actual cost data. The answer is not obvious, but it is clear that the independent estimators will have greater difficulty finding meaningful cost data for their estimates if PBA is more widely used.

Another area in which independent estimators may be affected by PBA is milestone scheduling. Presumably, when a program in development satisfies its testing and other requirements, a Milestone C decision can be conducted and the production contract awarded expeditiously if the details on price, etc., have been negotiated as part of the development contract award. For the SPO, with the workload of estimating production costs basically completed, preparing for a Milestone C would presumably be straightforward. The independent estimators, with a normal cycle time of six months from start of their

estimate to the milestone decision, may find themselves pressed for time if senior acquisition leaders want to push a decision quickly. A schedule crunch, coupled with reduced cost data, could render the development of an independent cost estimate a more formidable task than it would be under CBA, where program cost data should be more available.

There are no easy answers to either of these situations. The guiding philosophy of the leadership of the cost estimating community, coupled with the approach of senior acquisition leaders in terms of what they want an independent estimate to contain, may permit an approach in which a “not to exceed” type of independent cost estimate is sufficient to satisfy the requirements of Public Law and the acquisition leaders’ assessment of program risks. In other words, it may be sufficient for independent estimators to examine the price commitments and contract provisions of a specific program in order to arrive at an informed “not-to-exceed” estimate, rather than having to provide a specific point estimate for the program. Given the general history of DoD cost overruns from estimates made at Milestone II/B, such an approach might help reinforce the idea that a range of likely cost outcomes is a more useful approach for senior decision-makers than are point estimates developed by the SPO and the independent cost analysts.

## Summary of Findings and Concluding Observations

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Previous chapters have addressed the topic of PBA in terms of background, processes, potential savings, actual experiences of DoD and contractors, PBA-like case studies, and implementation issues. In this final chapter, we summarize the answers to our seven basic research questions about PBA, lay out the circumstances in which PBA appears to be the most appropriate, and address one key policy issue. In addition, we present an alternative to the pure PBA approach, and we provide a “bottom line” to the entire PBA process that summarizes the lessons learned.

### Key Research Questions

1. **Is there documented evidence that prices paid for DoD systems, goods, and services have been reduced through the use of PBA compared with CBA processes?** The answer to this first question is basically no. PBA alone has not produced documented savings on overall prices for weapon systems. The analysis of our case studies and the interviews we conducted with experts both strongly indicate that any identifiable program cost savings possibly attributable to PBA are the result of multiple causal factors and unique program specifics. PBA is almost never implemented as a lone policy initiative; instead, it is almost always implemented in conjunction with various other reform measures. For example,

a case can be made that savings have accrued to DoD when PBA was coupled with competition; but in our view, these savings could have been produced in a CBA environment as well. It is nearly impossible to isolate the effects of PBA from the effects of companion measures, or even from aspects of a program that are totally unrelated to PBA. Perhaps even more important, DoD provides no direction for tracking cost or schedule savings from PBA—or, indeed, any other acquisition reform measure—in a systematic and methodologically convincing way. Consequently, such data are not collected by either DoD or contractors, nor would we suggest that collecting such data would be cost-effective (see pp. 56–60).

2. **Is there documented or anecdotal evidence that PBA has reduced contractor overhead rates/charges?** The answer here is also no, for many reasons. Overhead rates are a result of costs and workload, both of which change regularly at contractor facilities, making it impossible (and, we might add, ill advised) to track isolated, individual PBA savings. Although we did find some minor savings for individual programs, we were not convinced that there were overall savings in overhead to DoD given that contractors must retain their compliant accounting systems and knowledgeable personnel if they have even one CBA program in development or production. As Chapters Two and Three and the case studies in Chapter Four show, the contractor savings directly attributable to PBA in such areas as proposal preparation are usually a very small percentage of total contract value, because such costs appear to be relatively small even under CBA. In most instances, such cost savings will be well under 1 percent of the total contract value. It thus would take total PBA implementation to significantly reduce this workforce, and even then the savings would likely be small due to contractors needing some sort of cost accounting systems for their own internal management (see pp. 50 and 60–70).
3. **Is there evidence that the acquisition process has been shortened using PBA versus CBA processes?** The answer here is not likely. Certainly, the process flow charts (Tables 2.1, 2.2, 2.3) in Chapter



Two indicate that a few days could be saved in the overall contract award schedule, but only if the steps involving cost data are on the critical path to a contract award. In our discussions with DoD and contractor professionals, they indicated that the schedule driver in a source selection was more likely to be the technical evaluation, not the cost analysis activities. Later in a program's life, when the contract is a sole-source award for production, contract award dates are normally set in advance, so people orient their efforts and adjust their activities (which may involve other programs) according to those dates. For emergency situations in which the contractor needs to quickly get working, an undefinitized contracting action (UCA) is an option. With the average MDAP in development for a decade, and production lasting sometimes even longer, the savings of a few days or weeks of effort pales (see pp. 70–78).

4. **Is there evidence that DoD acquisition workload has been reduced through the use of PBA?** The answer to this question is generally yes. Based on our interviews and case studies, it appears that when PBA is used, the workload for both DoD and the contractor is almost always reduced in some of the traditional phases of contract preparation and management (see Chapters Two, Three, and Four). Under PBA, the contractor has to prepare and submit fewer cost data, and the DoD evaluators have to address fewer data. However, sometimes the workload increases in other areas, those related to new, PBA-required upfront activities such as market and price research. For an individual program, we found (see Chapter Two) that only one step, market research, probably increased the workload for DoD analysts; but we also found that 13 steps resulted in at least some theoretical reductions in workload. This finding of savings in individual steps was supported by what we learned in our interviews.

The available reliable data on the net effect of workload reductions are few. Also, workload reductions for a specific program may not translate into overall cost and schedule savings for DoD, since overhead resources are often shifted to other tasks rather than eliminated. So whether this workload reduction can

be translated into true savings is unknown. Certainly, less workload on one program would allow people to work on other programs or to spend more time on tasks related to the PBA program. If, in an aggregate sense, enough workload was eliminated by a number of PBA programs with compatible schedules, the workforce could be reduced, producing a savings to the government either directly, through a reduction of DoD personnel, or indirectly, through a reduction in contractor personnel. Realistically, given the number of PBA MDAPs, this would be difficult to administer and prove. But, if nothing else, workforce morale could be improved by the removal of what may be considered low value-added work and by letting people apply their energies to areas with higher payoffs (see pp. 78–83 and 89–95).

5. **Is there evidence that additional competitors (at the prime, sub-contractor, or supplier levels), particularly companies that do not normally do business with DoD, have participated in DoD procurements as a result of PBA?** The answer here is that we found little evidence that PBA had any significant impact on bringing in new suppliers and/or technologies to DoD weapon system programs. Even under CBA, prime contractors can bring in suppliers without CAS compliant systems by competing specific portions of a weapon system. However, in the world of weapon system development, knowing the DoD system and being able to integrate technologies are probably as important as the new technologies themselves. Other options, such as licensing or buying commercial products, are available to primes or major subcontractors to capture the latest technologies, even under CBA rules (see pp. 107–124 and 132–135).
6. **Is there documented evidence that the use of PBA has measurably increased contractor incentives to reduce cost through CAIV or other commercial-like incentive mechanisms?** Our analysis of the munitions programs indicates that a yes answer is probably true, but again, the role played by PBA is difficult to discern. Since there is no access to contractor accounting records, only the companies involved know the actual realized profits on the PBA systems. A key to seeing whether these incentives work is for DoD

to “walk the talk,” sustaining the prices and quantities originally agreed to in early negotiations. If contractors suspect that bidding will be reopened later and that they will be required to provide their actual costs to justify prices, their incentive to reduce costs to maximize profits will be negatively affected. A factor compounding this situation is the fluid nature of most weapon systems’ requirements and designs. With DoD and the contractors regularly changing both, the provision of some cost data (and thus at least partial visibility into costs) will be inevitable for these changes. This is not to say that trying to incentivize contractors to reduce their costs and thereby maximize their profits is undesirable for the longer-term health of the defense industry (see pp. 107–124 and 128–130).

### **Program Characteristics Supporting Use of PBA on Sole-Source Military-Unique Programs**

Based on our discussions with senior acquisition officials and our examination of numerous case studies, it is clear to us that PBA is and should remain important as a tool available for acquisition managers on large sole-source military-unique FAR Part 15 programs. Nonetheless, as discussed above, PBA should be used selectively and judiciously in these circumstances. The PBA Study Group Report arrived at similar conclusions. Some of the characteristics that potentially make programs appropriate candidates for PBA include (see Chapters Three and Four):

- A high level of contractor competition, either direct or indirect, preferably at the beginning of the program and throughout the program life cycle.
- Clearly defined and stable system performance requirements.
- Relatively low technological risk during development and production.
- Relatively high commercial component content with “real” market pricing information available.

- An existing history of cost or pricing data from earlier production lots for the same or a similar item (if applied to an ongoing production program).

Finally, similar to another finding of the PBA Study Group Report, we believe PBA should be used in conjunction with a variety of other acquisition reform measures, the most important of which are CAIV, strict production price targets and thresholds during development, and LTPAs with prenegotiated FFPs or PPCCs.

## **Commercial Item Determinations**

Numerous working-level officials we interviewed were seriously concerned about the ability to determine fair and reasonable prices when senior acquisition personnel make commercial item determinations. Certainly, the intention of PBA advocates at senior levels has been to overcome the culture and the processes developed over the years that have required the submittal and evaluation of excessive volumes of cost and pricing data. In their view, this was at the heart of the CBA problem, so downward-directed pressure would be needed to overcome bureaucratic obstacles. However, the ultimate responsibility for determining a fair and reasonable price lies with the CO, who must live with this decision throughout the contract's life. Therefore, we recommend that DoD re-examine the current, very broad definition of "commercial item" and provide more guidance to COs in the field on how to go about granting commercial determinations in cases involving items that have not been sold routinely to the general public or non-governmental entities (see pp. 107–124 and 142–144).

## **Alternative CBA Applications**

One objective of PBA advocates is to change the traditional approach that DoD practitioners take to cost data. Cost data requested by the government in a contractor proposal can run the gamut from

detailed, voluminous data, to specific costs on certain parts of a weapon system, to mere access to a contractor's cost accounting systems. Some DoD cost and price analysts certainly ascribe to the philosophy that there can never be too many cost data for them to collect and evaluate, even if those data are not directly related to the task of establishing a fair and reasonable price. We recommend that when contractor cost data are requested in an acquisition, the request be for judiciously tailored cost data rather than for a complete "sweep" of all cost data. In addition, allowing contractors to submit the data in their own format would alleviate their burden while still allowing DoD evaluators to gain insight into contractor costs. Data tailoring such as this could put CBA close to PBA in terms of workload. The elimination of TINA certifications is its own issue, with problems as noted in the recent legislation on waivers. However, except for cases in which DoD feels that circumstances with a contractor absolutely warrant TINA certification, its value added seems questionable. Again, serious deliberation should precede the decision to require or waive TINA as part of a CBA acquisition (see Chapter Four and Chapter Five, pp. 88–100 and 135–141).

## **The Bottom Line**

So where does all this leave us? At the end of the day, senior DoD leadership would be well advised to encourage COs to view PBA as one very important tool among many in their toolbox, and not as a mandate or a panacea to apply across the board or in accordance with a strict formula in certain situations. PBA is likely to contribute to at least modest savings in cost, schedule, and workload when flexibly and judiciously applied to MDAPs along with considerable input from the acquisition officials directly involved. It is in this sense that the use of PBA should be encouraged and expanded.

In conclusion, we believe that full application of PBA in the appropriate circumstances may result in cost, schedule, and workload savings to DoD. However, given the existing evidence, the magnitude of these savings is nearly impossible to quantify. Based on the little

quantifiable evidence we were able to retrieve related to the contracting process and overhead costs, we suspect that the savings realistically obtainable through the use of PBA within the current acquisition system are rather modest. It is possible that much more significant cost savings can be achieved by using radical forms of PBA in certain unique types of programs to more effectively incentivize contractors to cut costs, but at this point there is no hard quantifiable evidence to support this assertion. To resolve this issue definitively, DoD would have to develop more-effective metrics for tracking and comparing program outcomes that were specifically aimed at PBA issues.

## Government and Industry Questionnaire on Price-Based Acquisition

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### Key Questions to Be Answered

1. To your knowledge is there documented evidence that prices paid for DoD systems, goods, and services have been reduced through the use of PBA compared with cost-based acquisition (CBA) processes?
  - a. How were these savings estimated?
2. Is there documented or anecdotal evidence that PBA has reduced contract or overhead rates/charges?
  - a. How are program financials tracked and managed differently in a program requiring TINA compliant or certified cost data compared with one that does not?
  - b. Can quantifiable cost implications be identified? (Audits, TINA compliant proposals, etc.)
3. Is there documented evidence that the use of PBA has encouraged and promoted the CAIV process during EMD and further cost reduction during production?
  - a. Are contractors more likely to focus on cost reduction in a PBA program during design and development? What are the linkage and motivation provided by PBA?
  - b. Are contractors more likely to focus on cost reduction during production since the contractor retains cost savings? How does the government realize a fair share of these savings?

4. Is there evidence that additional competitors (at the prime, sub-contractor, or supplier levels), particularly companies that do not normally do business with DoD, have participated in DoD procurements as a result of PBA?
  - a. If so, can this participation be linked to lower prices paid and/or better products acquired?
  - b. Are there specific examples of commercial technology from commercial companies that has been incorporated into a military system because of PBA?
5. Is there evidence the acquisition process has been shortened using PBA versus cost-based acquisition processes?
  - a. Is there evidence that DoD acquisition workload has been reduced through the use of PBA?
  - b. How can the government guard against the possibility of “excessive profits” when PBA is implemented?

### **Questions for Specific PBA Programs (Case Studies)**

1. What was the justification for initial use of PBA? (Basis for TINA waiver, underpinning of assessment of reasonable and fair price, etc.) If one of the categories below applies, please comment in detail.
  - 1.1. Price derived from recent certified cost data for same or variant of same item.
  - 1.2. Price determined by government-initiated direct or indirect competition.
  - 1.3. Price determined by contractors thinking there is a competition, even if only one ends up bidding.
  - 1.4. Price determined by comparison with similar items where there is competition.
  - 1.5. Price determined by designation as commercial item (FAR Part 12).



2. What was the type of production pricing agreement and length of time and number of production lots covered by the pricing agreement? What type of access to cost data did DoD have? What were the opportunities for DoD to assess reasonableness/fairness, and to renegotiate the price during discrete contract periods? Please expand on any subcategories below if applicable.
  - 2.1. LTPA: base year agreement plus options.
  - 2.2. MYP.
  - 2.3. AUPPC + PPCC + carrots and sticks, derived from competitive EMD phase (production price thresholds and objectives from analogies, “must cost,” CAIV, market research, budget affordability).
3. What was the method of pricing follow-on contracts for additional lots beyond those explicitly covered in the initial contract? Please expand on any of the categories below that are relevant.
  - 3.1. Continue existing price/remain on PPCC/stick to AUPPC.
  - 3.2. Require certified cost or pricing data.
    - 3.2a. Require noncertified cost or pricing data and documentation (BOEs or limited data—commercial model).
  - 3.3. Generate improvement curve derived from earlier certified cost or pricing data.
  - 3.4. Designate as commercial item (FAR Part 12), compare price to similar items through market research.
  - 3.5. Develop joint DoD/contractor pricing models based on uncertified contractor cost data and DoD cost analysis (analogies, market research parametric analysis, etc.).
    - 3.3a & 3.5a. Develop pricing bands depending on quantity purchased.
4. What were the methods of pricing the development and production work of major modifications and ECPs arising during an existing PBA production contract? Please expand on any of the categories below that are relevant.

- 4.1. Negotiate price based on market research, “must cost,” non-certified contractor data, or other methods, without certified cost or pricing data.
- 4.2. Require certified cost or pricing data.
  - 4.2a. Require noncertified cost or pricing data and documentation (BOEs or limited data).
- 4.3. Hybrid: require certified or noncertified cost or pricing data for new nonrecurring work; use existing price agreement data for unchanged recurring elements.
5. How were PBA contracts adjusted for large changes in production quantity and schedule (outside PPCC bands)? Please expand on any of the categories below that are relevant.
  - 5.1. Stick to existing price.
  - 5.2. Require certified cost or pricing data.
    - 5.2a. Require noncertified cost or pricing data and documentation (BOEs or limited data).
  - 5.3. Renegotiate price (or expand existing PPCC bands) by generating an improvement curve and quantity curve based on DoD price analysis combined with input from contractor.
6. What was the contractual relationship between hardware price, peripherals, and support contracts and concepts? Please expand on any of the categories below that are relevant.
  - 6.1. Negotiate separate types of contracts for each area.
  - 6.2. Negotiate single global PBA TSPRs contract.

## **General Question Concerning PBA Implementation**

1. Compared with a proposal/contract where TINA certified cost or pricing (CC&P) data are required, what steps/actions are eliminated from the proposal/contracting processes under PBA?
2. What are the most labor intensive steps under Cost-Based Acquisition FAR Part 15 (CBA) that are eliminated under PBA? What steps are the most worrisome or least value added?

3. Does PBA allow for a faster proposal and contract award schedule?
4. In contracts awarded under PBA, what savings did you estimate?
  - a. How did you calculate the savings?
  - b. Did these savings get identified specifically in your proposal estimates, either internally to the contractor or to DoD?
5. In general, how much are contractor proposal costs as a percentage of the total contract award?
  - a. Can you provide several representative contract awards and proposal costs associated with each?
  - b. Are the proposal costs separately identified? Are only the direct costs associated with the proposal preparation identified, i.e., are there other costs in the bid and proposal (B&P) category or other costs not separately identified? Do you identify any of these indirect proposal or contract costs?
6. If all DoD contracts were awarded under PBA, how many workyears of proposal preparation effort could be saved on both the government and the industry side? Would these show up as direct contract proposal savings or as reduced B&P or other overhead rate reductions?
  - a. Do these people (cost estimators, contract pricers, etc.) have duties in addition to proposal preparation responsibilities that would have to be done even under a complete PBA environment?
7. Is DoD consistent in its application of PBA policy and procedures for proposals/contracts?
8. What is your overall assessment of using the following alternatives to pure PBA: Alpha Contracting either with TINA certified data required or without TINA certified data?
  - a. Can you estimate additional costs or time required under either scenario compared with pure PBA?
9. What is your assessment of using the following alternative to PBA: a process whereby the contractor submits cost or pricing data that do not have to be TINA certified?

- a. Can you estimate the cost or time savings compared with a TINA certified proposal?
10. How much can be saved in terms of time and effort if the following is used as an alternative to PBA: a contract in which a base year with options is negotiated using certified data (but a non-multi-year contract) and then is awarded in subsequent years without significant discussion or submission of cost/pricing data? Does this involve any more work in the option years than a pure PBA environment does?

*Please comment on the following claimed potential downside risks in using PBA:*

1. Potential for higher prices paid by DoD due to reduced visibility into contractor costs.
2. Reduction in data available for analyzing the cost of future programs.
3. Questionable “commerciality” rulings leading to inappropriate application.
4. “Excessive profits” when PBA is implemented—how can the government guard against the possibility or perception of this?

*Please comment on the claimed difficulties of using PBA on single source, noncommercial programs:*

1. Change in culture required by both DoD personnel and defense contractors—some in DoD are forward leaning, some resist change. Pushback from resisters?
2. Need new kinds of skills—market research instead of cost analysis—few resources for new learning.
3. Lack of reliable market price information or analogies with unique new military systems.
4. Assessing reasonableness when pricing later lots/buys with limited data. Hard to capture savings in renegotiation without insight into costs.
5. Difficulties in pricing modifications and ECPs.

6. Difficulties in pricing when quantities fall outside of production price commitment curve or previously negotiated quantity bands.
7. Changes in legislation that significantly raise bar for granting TINA waivers.



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