

Seminar Information
NCMA Audio Seminar – February 17, 2009
Cost Estimating Fundamentals – Q & A

Welcome to the National Contract Management Association's Audio Seminar entitled,
Cost Estimating Fundamentals – Q & A.

For over five years now, NCMA has been bringing you timely Audio Seminars on current, significant contract management issues. Tens of thousands of professionals have participated in our programs. We appreciate your participation today and would like to have you join us for future events.

Please join us on Thursday, February 26 for our hot topic presentation on **The Brave New World of Government Contractor Compliance Programs.** Participants will learn the essential elements of an effective ethics compliance program for government contractors and provide practical advice in creating and managing such a program.

Presenters include:

- **James C. Fontana**, the Senior Vice President, General Counsel and Corporate Secretary of Alion Science and Technology Corporation, and
- **J. Scott Hommer**, a partner at the law firm of Venable LLP

Complete details and registration forms are available at NCMA's website:

www.ncmahq.org.



Audio Seminar Host Site Checklist

BEFORE THE DAY OF THE PROGRAM:

- Confirm the meeting space is set up and the speaker phone is working properly.
- Make a copy of the material packet for each participant.
- Please remember, this is copyrighted material and should only be copied and given to those in attendance at the virtual seminar.
- Make duplicate copies of participant roster sheet if you will have more than 10 people participating.

AS PEOPLE ARRIVE:

- Hand out material packet with PowerPoint presentation and program evaluation.
- Have participants sign in on the site roster. This will aid you later in distributing the Certificates of Completion.
- Each participant who wishes to obtain CEU Credits should sign in on the site roster and return their completed course evaluation.

BEFORE THE PROGRAM BEGINS:

- If you plan to display the slides on a screen, increase the page size to 150% to enhance readability.
- Remind participants to sign in on the site roster for CEU Credits if they have not done so.
- Remind participants to fill out and return the evaluation form at the end of the program.
- Take a final count of the number of participants at your site and enter it on the site roster.

AFTER THE PROGRAM:

- Remind participants one last time about the evaluation forms and have them turn them in before leaving.

NEXT DAY:

- Fax evaluation forms and participant site roster to KRM at 800.472.5138 or 715.833.5476.

POST SEMINAR FOLLOW UP:

- Distribute a copy of the Certificate of Completion to each participant on the site roster. They are free to fill in their own name in any manner they choose, i.e., type, calligraphy, etc.



Gregory A. Garrett

Gregory A. Garrett, CPCM, PMP
Managing Director

Navigant Consulting
8000 Towers Crescent Drive 3rd Floor
Vienna, VA 22182
Tel : 703-734-5953
Fax : 703-734-5901

gregg.garrett@navigantconsulting.com

Education and Certifications

- B.S. in Chemistry/Engineering Physics, Miami University
- M.S. in Systems Management, University of Southern California (USC)
- Certified Professional Contracts Manager (CPCM)
- Master's Certification in Government Contracting, The George Washington University
- Project Management Professional (PMP)
- Executive Education – Advanced Program Management, Stanford University

Professional Associations

- Project Management Institute (PMI)
- National Contract Management Association (NCMA) – Board of Advisors
- Association of Proposal Management Professionals (APMP)
- National Defense Industrial Association (NDIA) – Program Management Systems Committee

Gregory A. Garrett is a Managing Director with the Government Contractor Services practice, and resides in the Vienna, Virginia office. He is an internationally recognized expert in contract management, supply chain management, cost estimating, and program management. He is also a best-selling author, dynamic speaker, and a highly respected international business consultant. During the past 25+ years, he has managed more than \$30 Billion of large complex contracts and projects in both the U.S. government and industry. He has taught and consulted with more than 25,000 business professionals in 40 countries worldwide.

Mr. Garrett specializes in assessing business risk and providing recommendations for performance improvement of contractor strategic planning, proposal/capture management, purchasing systems, cost estimating systems, contract pricing, supply chain management, earned value management systems, and program management practices. He also serves as an expert witness in support of client claims/litigation.

Prior to joining Navigant Consulting, Mr. Garrett served as President and CEO of his own business, Garrett Consulting Services. Formerly, he served as Chief Operating Officer for Acquisition Solutions, Inc. where he led consulting engagements for over 30 U.S. Federal Government Agencies. He also served 9 years with Lucent Technologies as Chief Compliance Officer and VP of Program Management. Previously, he served as a highly decorated military officer for the United States Air Force, including assignments as: program manager Space Systems Division, warranted contracting officer Aeronautical Systems Division, professor of contracting management Air Force Institute of Technology, and acquisition action officer, HQ USAF the pentagon. A prolific writer, Mr. Garrett has authored 12 books and more than 75 published articles on bid/proposal management, contracting, project management, cost estimating, contract negotiations, and leadership.

Professional Experience

Mr. Garrett has worked with government contractors on a variety of complex issues, including:

- Creating a Global Program Management Methodology, with processes, policies, tools, and training, supporting more than 2,000 project managers in over 40 countries for a Fortune 100 information technology firm
- Creating a comprehensive bid/proposal/capture management methodology, with process, policies, tools, and training for a Fortune 100 global services firm
- Evaluating the Life-Cycle buying and selling contract management and supply chain management processes of numerous Fortune 500 Firms to determine action plans to optimize business results
- Developing and implementing a robust and cost effective Earned Value Management System (EVMS) for a growing Top 50 U.S. Department of Defense government contractor
- Preparation for pending government reviews and audits conducted by the Defense Contract Management Agency (DCMA) and Defense Contract Audit Agency (DCAA), including: Contractor Purchasing Systems Review (CPSR), Government Property Management Systems Review, Integrated Baseline Review (IBR), Cost Estimating, and Contract Pricing Systems Reviews
- Serving as an expert contract negotiator/consultant to enable numerous Fortune 500 firms to obtain the best possible contract negotiation results on large complex high technology contracts
- Conducting Benchmarking studies of contract management and subcontract management processes, policies, tools, and training for numerous government agencies and government contractors
- Developing and conducting customized professional training seminars on numerous business topics worldwide, including: cost estimating and contract pricing, contract negotiations, bid/proposal/capture management, performance-based contracting, life-cycle contract management, program management, supply chain management, and leadership

Brent A. Calhoon

Brent A. Calhoon, CPA
Director

Navigant Consulting
8000 Towers Crescent Drive, 3rd Floor
Vienna, VA 22182
Tel: 703.734.5914
Fax: 703.734.5902

bcalhoon@navigantconsulting.com

Education

- B.S. in Accounting, with honors, Virginia Polytechnic Institute & State University
- Certified Public Accountant in the Commonwealth of Virginia

Professional Associations

- American Institute of Certified Public Accounts
- National Defense Industrial Association
- Associate Member of the American Bar Association (Public Contract Section)
- National Contract Management Association

Mr. Calhoon is a Director with Navigant Consulting, Inc's Government Contractor Services practice. (NCI), resident in the firm's Vienna, Virginia office. Prior to joining NCI in 2002, he served as a manager with Arthur Andersen's Government Contractor Advisory Services practice. Mr. Calhoon has worked with a broad array of public and private companies providing consulting, accounting, auditing, and investigative services in a wide variety of industries including aerospace and defense, transportation, energy, healthcare, construction, and manufacturing. Mr. Calhoon also has private industry experience as a manager of contract pricing and analysis for a manufacturing and services company and as a cost accountant for an auto parts manufacturer.

Professional Experience

Mr. Calhoon has advised clients, and worked with outside counsel, to resolve disputes involving issues of cost allowability, cost allocability, and regulatory compliance arising under the Federal Acquisition Regulation, Cost Accounting Standards, the Truth in Negotiations Act, and other cost accounting-related rules and regulations. He has also helped clients design and develop cost allocation systems and assisted clients to prepare incurred cost submissions; CASB disclosure statements; cost impact statements; termination settlement proposals; and responses to allegations of defective pricing and other wrongdoings.

He has extensive experience assisting companies prepare and support contract cost proposals as well as investigate and prepare change orders, claims, and termination settlement proposals. He has prepared and reviewed cost estimates and developed the bases and assumptions thereof. His work has included in-depth analyses of financial accounting and cost accumulation systems to create and support cost estimating and cost allocation methodologies. In addition, he has performed incurred cost audits to assess contractor accounting practices and compliance with applicable government contract accounting rules and regulations. He has supported his clients in connection with cost and price negotiations with the Government.

Mr. Calhoon has assisted clients either to design or improve business processes and functions critical to managing compliance and financial risks unique to government contractors. In this regard, his assistance has included identifying, implementing, and monitoring process improvements to reduce risks and increase efficiencies in various functional areas such as pricing and estimating; cost accounting; billing; procurement and subcontractor management; timekeeping, and travel expense reporting. In connection with these activities, he has drafted policy and procedure manuals and desk procedures, created standard forms and templates; and conducted training.

Mr. Calhoon has significant procurement and procurement compliance experience. He has both prepared and assessed the adequacy of corporate procurement policies and procedures and procurement documentation, including: price reasonableness justifications, sole-source justifications, negotiation memoranda, and cost analyses. He has also planned and led independent compliance reviews to help clients prepare for and pass Contractor Purchasing System Reviews.

While in private industry, Mr. Calhoon was responsible for such things as preparing contract proposals, organizing and submitting cost or pricing data, and participating in price negotiations with the Government. He was also responsible for analyzing contract cost performance, preparing incurred cost submissions, and ensuring compliance with disclosed accounting practices.

Both as a consultant and while in private industry, Mr. Calhoon acted as a liaison to the Defense Contract Audit Agency (DCAA). He has helped clients prepare for and respond to DCAA requests for information, negotiate and resolve audit issues, and analyze and respond to DCAA (and other oversight agency) audit reports on a broad range of technical accounting and compliance matters.

Mr. Calhoon has conducted several independent investigations employing forensic accounting techniques to assess allegations of fraud, accounting errors and irregularities, cost mischarging, and defective pricing. Additionally, he has provided both audit and financial accounting-related services to government contractors and other commercial companies. Some of his responsibilities have included evaluation of stock option accounting and disclosure practices; evaluation of revenue recognition practices; analysis of contract margin realizability including estimates-to-complete; analysis of cost accounting structures and internal controls; and preparation of financial statements and required disclosures.

He also advised clients regarding preparation for, and compliance with, Section 404 of the Sarbanes-Oxley Act. He has helped his clients to evaluate and improve the design and operational effectiveness of internal controls, including disclosure controls over financial reporting. In this regard, he has documented, evaluated, and improved policies and procedures; evaluated internal control effectiveness; helped establish and strengthen internal control systems; and developed and provided internal control training.

Mr. Calhoon has also instructed on various government contract accounting, pricing, and regulatory compliance topics for his clients and for seminars sponsored by Federal Publications Seminars, LLC. He also speaks at industry association meetings and has co-authored several articles on government contract cost accounting, pricing and regulatory compliance matters.

NCMA & Navigant Consulting, Inc.

Audio Seminar Series

Topic: Cost Estimating Fundamentals

By:
Gregory A. Garrett, CPCM, C.P.M., PMP
and
Brent Calhoun, CPA
February 17, 2009



NAVIGANT
CONSULTING

Question 1: Describe the basic characteristics of credible cost estimates.



Answer (Per the Government Accountability Office *Cost Assessment Guide 2007*):

- Clear identification of task(s)
- Broad participation in preparing estimates
- Availability of valid data
- Standardized structure for the estimate
- Provision for program uncertainties
- Recognition of inflation
- Recognition of excluded costs
- Independent review of estimates
- Revision of estimates for significant program changes

Question 2: What are the primary cost estimating methods?



Answer (Per the Society of Cost Estimating and Analysis, 2003):

- Analogy method (historical data)
- Parametric analysis method
- Weighted average method
- Technical consensus method
- Engineering build-up method

Reference Text pg. 4: "Cost Estimating and Contract Pricing: Tools, Techniques, and Best Practices," by Gregory A. Garrett, CCH, Chicago, IL 2008.

Page 3

NAVIGANT
CONSULTING

Question 3: How do the three most commonly used cost estimating methods compare to each other?



Answer:

Three Most Commonly Used Cost Estimating Methods Compared			
Method	Strength	Weakness	Application
1. Analogy	<ul style="list-style-type: none"> • Requires few data • Based on actual data • Reasonably quick • Good audit trail 	<ul style="list-style-type: none"> • Subjective adjustments • Accuracy depends on similarity of items • Difficult to assess effect of design change • Blind to cost drivers 	<ul style="list-style-type: none"> • When few data are available • Rough-order-of-magnitude estimate • Cross-check
2. Engineering build-up	<ul style="list-style-type: none"> • Easily audited • Sensitive to labor rates • Tracks vendor quotes • Time honored 	<ul style="list-style-type: none"> • Requires detailed design • Slow and laborious • Cumbersome 	<ul style="list-style-type: none"> • Production estimating • Software development • Negotiations

Reference Text pg. 41

Page 4

NAVIGANT
CONSULTING

Question 3: How do the three most commonly used cost estimating methods compare to each other? (continued)



Answer:

Three Most Commonly Used Cost Estimating Methods Compared (continued)			
Method	Strength	Weakness	Application
3. Parametric	<ul style="list-style-type: none"> Reasonably quick Encourages discipline Good audit trail Objective, little bias Cost driver visibility Incorporates real-world effects (funding, technical, risk) 	<ul style="list-style-type: none"> Lacks detail Model investment Cultural barriers Need to understand model's behavior 	<ul style="list-style-type: none"> Budgetary estimates Design-to-cost trade studies Cross-check Baseline estimate Cost goal allocations
<small>Source: Government Accountability Office, Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs, GAO-07-11345P (Washington, DC: July 2007)</small>			

Reference Text pg. 41

Page 5



Question 4: What are the 12 Steps to GAO's High-Quality Cost Estimating Process?



Answer:

GAO The 12 Steps of a High-Quality Cost Estimating Process		
Step	Description	Associated Task
1.	Define the estimate's purpose.	Determine: <ul style="list-style-type: none"> The estimate's purpose The level of detail required Who will receive the estimate The overall scope of the estimate
2.	Develop an estimating plan.	<ul style="list-style-type: none"> Determine the cost estimating team Outline the cost estimating approach Develop the estimate timeline Determine who will do the independent cost estimate Develop the team's master schedule

Reference Text pg. 11

Page 6



The 12 Steps to GAO's High-Quality Cost Estimate



Step	Description	Associated Task
3.	Define the program characteristics.	Identify in a technical baseline description document: <ul style="list-style-type: none"> • The program's purpose • Its system and performance characteristics • Any technology implications • All system configurations • Program acquisition schedule • Acquisition strategy • Relationship to other existing systems • Support (manpower, training, etc.) and security needs • Risk items
4.	Determine an estimating approach.	<ul style="list-style-type: none"> • Define the work breakdown structure (WBS) and describe each element in a WBS dictionary; a major automated information system may have only a cost element structure • Choose the estimating method best suited for each WBS element • Identify potential cross-checks for likely cost and schedule drivers • Develop a cost estimating checklist

Reference Text pg. 11

Page 7

NAVIGANT
CONSULTING

The 12 Steps to GAO's High-Quality Cost Estimate



Step	Description	Associated Task
5.	Identify ground rules and assumptions.	Clearly define what is included in and excluded from the estimate: <ul style="list-style-type: none"> • The estimate's base year, including time-phasing and life cycle • Program schedule information by phase • Program acquisition strategy • Any schedule or budget constraints • Inflation assumptions • Travel costs • Equipment the government is to furnish • Prime contractor and major subcontractors
6.	Obtain data.	<ul style="list-style-type: none"> • Create a data collection plan with emphasis on collecting current and relevant technical programmatic, cost, and risk data • Investigate possible data sources • Collect data and normalize them for cost accounting, inflation, learning, and quantity adjustment • Analyze the data to look for cost drivers, trends, and outliers; compare results against rules of thumb and standard factors derived from historical data • Interview data sources and document all pertinent information, including an assessment of data reliability and accuracy • Store data for future estimates

Reference Text pg. 12

Page 8

NAVIGANT
CONSULTING

The 12 Steps to GAO's High-Quality Cost Estimate



Step	Description	Associated Task
7.	Develop point estimates.	<ul style="list-style-type: none"> • Develop the cost model by estimating each WBS element using the best methodology from the data collected • Include all estimating assumptions in the cost model • Express costs in constant year dollars • Time-phase the results by spreading costs in the years they are expected to occur, based on the program schedule • Sum the WBS elements to develop the overall point estimate • Validate the estimate by looking for errors like double counting and omitting costs • Compare the estimate against the independent cost estimate and examine where and why there are differences
8.	Conduct sensitivity analysis.	<ul style="list-style-type: none"> • Test the sensitivity of cost elements to changes in estimating input values and key assumptions. • Identify effects of changing the program schedule or quantities on the overall estimate • On the basis of the analysis, determine which assumptions are key cost drivers and which cost elements are affected most by changes

Reference Text pg. 12

Page 9

NAVIGANT
CONSULTING

The 12 Steps to GAO's High-Quality Cost Estimate



Step	Description	Associated Task
9.	Conduct risk and uncertainty analysis.	<ul style="list-style-type: none"> • Determine the level of cost, schedule, and technical risk associated with each WBS element and discuss with technical experts • Analyze each risk for its severity and probability of occurrence • Develop minimum, most likely, and maximum ranges for each element risk • Use an acceptable statistical analysis methodology (e.g. Monte Carlo simulation) to develop a confident interval around the point estimate
10.	Document the estimate.	<ul style="list-style-type: none"> • Document all steps used to develop the estimate so that it can be recreated quickly by a cost analyst unfamiliar with the program and produce the same result • Document the purpose of the estimate, the team that prepared it, and who approved the estimate and on what date • Describe the program, including the schedule and technical baseline used to create the estimate • Present the time-phased life-cycle cost of the program • Discuss all ground rules and assumptions

Reference Text pg. 13

Page 10

NAVIGANT
CONSULTING

The 12 Steps to GAO's High-Quality Cost Estimate



Step	Description	Associated Task
11.	Present the estimate to management for approval.	Develop a briefing that presents the documented life-cycle cost estimate (LCCE) for management approval, including: <ul style="list-style-type: none"> • An explanation of the technical and programmatic baseline and any uncertainties • A comparison to an independent cost estimate (ICE) with explanations of any differences • A comparison of the LCCE or independent cost estimate to the budget • Enough detail do the presenter can easily defend the estimate by showing how it is accurate, complete, and high in quality
12.	Update the estimate to reflect actual costs and changes.	<ul style="list-style-type: none"> • Update the estimate to: <ul style="list-style-type: none"> • Reflect any changes in technical or program assumptions; or • Keep it current as the program passes through new phases or milestones • Replace estimates with earned value management (EVM) estimate at completion (EAC) and independent EAC from the integrated EVM system • Report progress on meeting cost and schedule estimates • Perform a post mortem and document lessons learned for elements whose actual costs or schedules differ from the estimate
Document all changes to the program, including how they affect the cost estimate.		
Source: Government Accountability Office, <i>Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs</i> , GAO-07-1134SP (Washington, DC: July 2007).		

Reference Text pg. 14

Page 11



Question 5: What are the sources of major risk in developing cost estimates?



Answer:

Sources of Major Risk

Uncertainty and risk in cost estimating and contract pricing arise from six main sources:

- Lack of buyer understanding of its requirements
- Shortcomings of human language and differing interpretations
- Behavior of the parties
- Haste
- Deception
- Poor cost estimating and pricing practices

Reference Text pg. 14

Page 12



Question 6: What is the difference between cost estimating and cost analysis?



Answer:

Although “cost estimating” and “cost analysis” are often used interchangeably, cost estimating is a specific activity within cost analysis. Cost analysis is a powerful tool because it requires a rigorous and systematic analysis that results in a better understanding of the program being acquired.

Reference Text pg. 20

Page 13

NAVIGANT
CONSULTING

Question 7: What are some common sources of cost data?



Answer:

Basic Primary and Secondary Data Sources		
Data	Primary	Secondary
Basic accounting records	X	
Data collection input forms	X	
Cost reports	X	X
Historical databases	X	X
Interviews	X	X
Program briefs	X	X
Subject matter experts	X	X
Other organizations	X	X
Technical databases	X	X
Contracts or contract estimates		X
Cost proposals		X
Cost studies		X
Focus groups		X
Research papers		X
Surveys		X

Source: Government Accountability Office, *Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs*, GAO-07-1134SP (Washington, DC: July 2007).

Reference Text pg. 40

Page 14

NAVIGANT
CONSULTING

Question 8: What is the value of a WBS?



Answer:

The work breakdown structure (WBS) provides a framework for defining work functions, tasks, and product/service requirements to ensure complete planning for all cost elements.

The WBS is the basic cost/management tool used to organize the elements and activities required to perform the specifications of the customer's request; it later becomes the tool for accumulating and recording incurred costs.

Reference Text pg. 20

Page 15

NAVIGANT
CONSULTING

Question 9: What does a Sample Cost Analysis Form look like?



Sample Cost Analysis Form													
Cost Analysis For (Company Name)/(Program Description)													
	Proposed			Technical			Auditor Recommended			Negotiated			Notes
	Hours	Rate	Value	Hours	Rate	Value	Hours	Rate	Value	Hours	Rate	Value	
Material													1
Direct Labor													2
Factory													3
Engineering Labor													4
Engineering Lead													5
ODC													6
G&A Total Cost													7
Profit													8
Cost of Money													9
Total Price													10

Signature: _____ Date: _____

Reference Text pg. 41

Page 16

NAVIGANT
CONSULTING

Question 10: What questions should you ask for checking the accuracy of cost estimating methods?



Answer:

Questions for Checking the Accuracy of Cost Estimating Methods	
Cost Estimating Methods	Questions
Analogy	<ul style="list-style-type: none"> • Are the analogous data from reliable sources? • Can any usual requirements invalidate the analogy? • Are the parameters used to develop an analogous factor similar to the program being estimated? • How were adjustments made to account for differences between existing and new systems? Were the adjustments logical, credible, and acceptable?

Reference Text pg. 40

Page 17

NAVIGANT
CONSULTING

Question 10: What questions should you ask for checking the accuracy of cost estimating methods? (continued)



Answer:

Questions for Checking the Accuracy of Cost Estimating Methods	
Cost Estimating Methods	Questions
Engineering build-up	<ul style="list-style-type: none"> • Was each WBS cost element defined in enough detail to use this method correctly? • Are data adequate to accurately estimate the cost of each WBS element? • Were experienced experts relied on to determine a reasonable cost estimate? • Was the estimate based on specific quantities that would be ordered at one time, allowing for quantity discounts? • Is there a definite understanding of each WBS cost element's composition? • Did they include all applicable overhead, general and administrative costs, and fees?
Technical consensus	<ul style="list-style-type: none"> • Do quantitative historical data back up the expert opinion? • How did the estimate account for the possibility that bias influenced the results?

Reference Text pg. 40

Page 18

NAVIGANT
CONSULTING

Questions to Consider



1. How well trained or educated are you in cost estimating?
2. How well does your organization develop its employees' cost estimating skills and competencies?
3. On a scale of 1 to 10 (1 = low/poor performance; 10 = high/outstanding performance), how would you rate your organization's capability of developing timely and accurate cost estimates?

Questions to Consider



4. Which cost estimating method(s) does your organization use most frequently?

What additional questions do you have for us?

For further information, please email:
gregg.garrett@navigantconsulting.com

THANK YOU



National Contract Management Association

Certificate of Attendance

This is to certify that

attended a one and one-half hour audio seminar sponsored by NCMA

Cost Estimating Fundamentals – Q & A
February 17, 2009

Steve Ayers, Fellow
NCMA National President

Hours of Instruction: 1.5 hours
Number of CPEs: 1.5
Number of CEU's: .15
Number of CLPs: 1.5 hours
Number of CMEs: 1.5 hours

Date of Issuance: February 17, 2009

Important Notice to Recipient: All CCCMs, CFCMs and CPCMs must recertify five years from the last date of recertification to maintain currency. The requirements for recertification are sixty hours of cumulative training, continuing professional education hours (six continuous education units of education). Ten of the sixty required hours must have been completed within the final eighteen months of the five-year period. The education and training must be of a nature that upgrades your contract management skills. Keep this certificate to use as verification for recertification.

Thank you for attending this event.

Today's event features an online, post-event evaluation form. To send us your feedback, please click on the link below, or type the URL into your web browser's address bar.

<http://eval.krm.com/eval.asp?id=14662>

Your feedback and comments are very important to us. Thank you in advance for taking the time to complete this evaluation!