NPS-CM-10-007

ACQUISITION RESEARCH
SPONSORED RESEARCH SERIES

Contingency Contracting Officer Proficiency Assessment Test Development

4 June 2010

by

Maj. Juan Arzu, USA,

Maj. Beire Castro, USA, and

Maj. Brian Mack, USA

Advisors: Cory Yoder, Senior Lecturer, and

Dr. Rene G. Rendon, Associate Professor

Graduate School of Business & Public Policy

Naval Postgraduate School

Prepared for: Naval Postgraduate School, Monterey, California 93943

ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL

The research presented in this report was supported by the Acquisition Chair of the Graduate School of Business & Public Policy at the Naval Postgraduate School.

To request Defense Acquisition Research or to become a research sponsor, please contact:

NPS Acquisition Research Program
Attn: James B. Greene, RADM, USN, (Ret)
Acquisition Chair
Graduate School of Business and Public Policy
Naval Postgraduate School
555 Dyer Road, Room 332
Monterey, CA 93943-5103
Tel: (831) 656-2092
Fax: (831) 656-2253
e-mail: jbgreene@nps.edu

Copies of the Acquisition Sponsored Research Reports may be printed from our website www.acquisitionresearch.org

ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL

Abstract

The establishment and standardization of training tasks by the Expeditionary Contracting Command (ECC) for Contingency Contracting Officers (CCOs) in the *Military Occupational Specialty 51C Soldier's Manual of Common Tasks (MOS 51C SMCT)*, in accordance with Army training doctrine, has helped subordinate units and individual CCOs within the ECC to focus their training efforts prior to deployment. This body of knowledge is a significant step in standardizing the pre-deployment training for CCOs and preparing them for their mission once deployed. To supplement this training, an appropriate performance-assessment tool is needed to measure performance of these 36 tasks. Currently, the ECC lacks a standardized method of measuring individual skill and task proficiency in its CCOs. This research developed the questions for a written proficiency test based on the 36 tasks listed in the *SMCT* in accordance with conditions, standards, and performance steps for each of the 36 tasks in the *SMCT*. The research team vetted each of the scenarios and accompanying questions through experienced CCO focus groups within the ECC. Upon completion of the test, the research team provided a written Contracting Officer Proficiency-assessment Test, encompassing over 1,100 questions covering each of the 36 tasks listed in the *SMCT*, to the Expeditionary Contracting Command.

Keywords: Contingency Contracting, Proficiency Assessment Test, SMCT, 51C, Soldier's Manual of Common Tasks, Contracting, individual assessment, Training

THIS PAGE INTENTIONALLY LEFT BLANK

NPS-CM-10-007

ACQUISITION RESEARCH SPONSORED REPORT SERIES

Contingency Contracting Officer Proficiency Assessment Test Development

4 June 2010

by

Maj. Juan Arzu, USA,

Maj. Beire Castro, USA, and

Maj. Brian Mack, USA

Advisors: Cory Yoder, Senior Lecturer, and

Dr. Rene G. Rendon, Associate Professor

Graduate School of Business & Public Policy

Naval Postgraduate School

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

List of Acronyms and Abbreviations

ACA	Army Contracting Agency
ACC	Army Contracting Command
AFARS	*Army Federal Acquisition Regulation Supplement*
AFIT	Armed Forces Institute of Technology
AR	Army Regulation
AT&L	Acquisition Technology and Logistics
CCBn	Contingency Contracting Battalion
CCE	Contracting Center of Excellence
CCO	Contingency Contracting Officer
CON234	Contingency Contracting Course
CONUS	Continental United States
CSB	Contingency Support Brigade
CWC	Commission on Wartime Contracting
DAU	Defense Acquisition University
DAWIA	*Defense Acquisition Workforce Improvement Act*
DFARS	*Defense Federal Acquisition Regulation Supplement*
DoA	Department of the Army
DoD	Department of Defense
DTIC	Defense Technical Information Center
ECC	Expeditionary Contracting Command
FAM	Functional Area Managers
FAR	*Federal Acquisition Regulation*
FM	Field Manual

GAO	Government Accountability Office
LTC	Lieutenant Colonel
MAJCOM	Major Command
MOS	Military Occupational Specialty
NPS	Naval Postgraduate School
ODS	Operation Desert Storm
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OUSD	Office of the Under Secretary of Defense
PAT	Proficiency Assessment Test
SF	Standard Form
SMCT	*Soldier's Manual of Common Tasks*
USAID	United States Agency for International Development
USMC	United States Marine Corps

Executive Summary

US Army contingency contracting officers (CCOs) play a critical role in nearly all overseas military operations by providing supplies and services to the warfighter in an efficient, timely, and ethical manner. Despite this critical role, the Army has not integrated its CCOs or the procurement process in a holistic approach to its expeditionary, warfighting mindset. Shortfalls in the number of US Army CCO personnel and the lack of a standardized training process have negatively affected the Army's expeditionary procurement capabilities.

The US Army's Expeditionary Contracting Command (ECC) was established in January 2008 in direct response to the Gansler Commission's recommendations to prepare, train, and provide skilled contracting personnel in support of US Army contingency operations. This new command, and other changes resulting from the Gansler Commission's recommendations, resulted in a planned net increase of over 400 uniformed and 800 civilian contracting officer positions.

The ECC developed a standardized set of 36 tasks to properly train CCOs prior to deployment. These 36 tasks, published in the ECC's *Soldier's Manual of Common Tasks (SMCT) MOS 51C Acquisition, Logistics, and Technology*, represent the body of knowledge that a 51C CCO must have to be successful during contingency operations.

The establishment and standardization of training tasks by the ECC for CCOs in the *MOS 51C SMCT*, in accordance with Army training doctrine, has helped subordinate units and individual CCOs within the ECC to focus their training efforts prior to deployment. This body of knowledge is a significant step in standardizing the pre-deployment training for CCOs and preparing them for their mission once deployed. To supplement this training, an appropriate performance-assessment tool is needed to measure performance of these 36 tasks. Currently, the ECC lacks a standardized method of measuring individual skill and task proficiency in its CCOs.

A written proficiency-assessment test will allow leaders in the ECC to measure a CCO's knowledge, skills, and capabilities. A written PAT will enable leaders to measure individual task proficiency against established standards, determine each CCO's preparedness to conduct duties during deployment, make appropriate CCO assignments, and develop individualized training programs for CCOs.

This research developed the questions for a written proficiency test based on the 36 tasks listed in the *SMCT*. The research team developed the scenarios and questions to assess proficiency in accordance with conditions, standards, and performance steps for each of the 36 tasks in the *SMCT*. Questions were structured to assess Bloom's cognitive domains of remembering, understanding, and, to a limited extent, application of tasks. The research team vetted each of the scenarios and accompanying questions through experienced CCO focus groups within the ECC. Upon completion of the test, the research team provided a written Contracting Officer Proficiency-assessment Test, encompassing over 1,100 questions, covering each of the 36 tasks listed in the *SMCT*, to the Expeditionary Contracting Command.

I. Introduction

A. Background

US Army contingency contracting officers (CCOs) play a critical role in nearly all overseas military operations by providing supplies and services to the warfighter in an efficient, timely, and ethical manner. Despite this critical role, the Army has not integrated its CCOs or the procurement process in a holistic approach to its expeditionary, warfighting mindset. Shortfalls in the number of US Army CCO personnel and the lack of a standardized training process have negatively affected the Army's expeditionary procurement capabilities (Gansler, 2007).

The 21st century has brought about significant changes to the manner in which US Forces conduct operations overseas. The post–Cold War reduction in forces saw a decrease in acquisition workforce professionals throughout the Army. At the same time, the United States military, and in particular the Army, significantly increased the outsourcing of many jobs that were previously performed by uniformed Service members (Gansler, 2007). This decrease in contracting professionals and increase in contracting requirements led to many deficiencies highlighted in the Gansler Commission report (2007).

The US Army's Expeditionary Contracting Command (ECC) was established in January 2008 in direct response to the Gansler Commission's recommendations to prepare, train, and provide skilled contracting personnel in support of US Army contingency operations (Gansler, 2007). This new command, and other changes resulting from the Gansler Commission's recommendations, resulted in a planned net increase of over 400 uniformed and 800 civilian contracting officer positions (DoA, 2009a). Most of the new uniformed positions within the ECC are coded "51C," the US Army's Military Occupational Specialty (MOS) code for contracting officer. The ECC developed a standardized set of tasks to properly train CCOs prior to deployment. These 36 tasks, published in the ECC's *Soldier's Manual of Common*

Tasks (SMCT) MOS 51C Acquisition, Logistics, and Technology, represent the body of knowledge that a 51C CCO must know to be successful during contingency operations (DoA, 2009a).

This research builds upon the 36 tasks listed in *MOS 51C SMCT* by building a proficiency-assessment test (PAT) for the *SMCT* tasks. The PAT developed throughout this research is nested with Army training doctrine prescribed in *US Army Field Manual (FM) 7-0* and provides an assessment and evaluation tool for individual task proficiency in CCOs. This assessment "provide[s] the link between the unit's [or individual's] performance and the [established] Army standard," as prescribed in the *SMCT* (DoA, 2002).

B. Problem Statement

The establishment and standardization of training tasks by the ECC for CCOs in the *MOS 51C SMCT*, in accordance with Army training doctrine, has helped subordinate units and individual CCOs within the ECC to focus their training efforts prior to deployment. This body of knowledge is a significant step in standardizing the pre-deployment training for CCOs and preparing them for their mission once deployed. To supplement this training, an appropriate performance-assessment tool is needed to measure performance of these 36 tasks. Currently, the ECC lacks a standardized method of measuring individual skill and task proficiency in its CCOs. The ECC determines CCO duty assignments and warrant levels without a quantifiable measure of 51C individual task proficiency. A written proficiency-assessment test will allow leaders in the ECC to measure a CCO's knowledge, skills, and capabilities. A written PAT will enable leaders to measure individual task proficiency against established standards, determine each CCO's preparedness to conduct duties during deployment, make appropriate CCO assignments, and develop individualized training programs for CCOs.

C. Research Objectives

The objective of this research is to develop a written proficiency test for the 36 tasks listed in the *SMCT*. The research team developed the scenarios and questions to assess proficiency in accordance with conditions, standards, and performance steps for each of the 36 tasks in the *SMCT*. We structured questions to assess Bloom's cognitive domains of remembering, understanding, and, to a limited extent, application of tasks (Bloom, 1956). The research team vetted each of the scenarios and accompanying questions through experienced CCO focus groups within the ECC. Upon completion of the test, we provided a written Contracting Officer Proficiency-assessment Test, covering each of the 36 tasks listed in the *SMCT*, to the Expeditionary Contracting Command. This final document included written documentation of scenarios, questions, and answers we developed.

To meet this objective, this research answered the following primary research question: What is the most effective and efficient method of measuring individual CCO task proficiency in the 36 tasks listed in the *SMCT*? Secondary research questions were as follows:

- How can a proficiency-assessment test be developed?
- What type(s) of testing is best suited to evaluate the cognitive domains of remembering, understanding, and, to a limited extent, application of knowledge?
- What type(s) of testing is most efficient—in terms of requiring the least amount of resources, such as overhead and setup—for the tester and test taker?

This research was completed when scenario(s) and accompanying questions for each of the 36 tasks had been developed, the scenarios and questions were vetted through focus groups of the ECC, and a final written version of the PAT was submitted to and received by the ECC. Additionally, the research team provided the ECC with recommendations as to the most effective format in which to issue the test.

D. Scope and Deliverables

The scope of this research project was limited to developing a test to assess proficiency in the 36 tasks listed in the *SMCT*. The specific deliverables at the conclusion of this research project were specifically designed to satisfy the research project objectives. The research team accomplished the following:

1. Developed a written proficiency-assessment test (PAT) that measures proficiency in each of the 36 tasks listed in the SMCT. The PAT included the following:
    a. Written scenarios for each of the 36 tasks.
    b. Questions for each of the scenarios that measure the cognitive domains of remembering, understanding, and, to a limited extent, application of knowledge of the 36 tasks.
2. Developed the scenarios and accompanying questions to assess proficiency in accordance with the conditions, standards, and performance steps listed in the *SMCT*.
3. Vetted each scenario and the accompanying questions through focus groups comprised of experienced CCOs and members of the ECC to ensure the scenario and questions satisfy the conditions, standards, and performance steps listed in the *SMCT*.
4. Built the PAT in a manner that allows it to be converted into a computerized assessment test.
5. Provided a written version of scenarios, questions, and answers to the ECC upon completion.

The ECC has established the 36 tasks in the *SMCT* as the body of knowledge that a CCO must know to be successful. The research team accepted these tasks and focused on developing the test to satisfy proficiency in that body of knowledge. Analysis of the relevance or validity of the 36 tasks as they relate to current, changing, or emerging trends in CCO tasks was not within the scope of this project. As such, this research did not analyze the validity of tasks listed in the *SMCT*. However, validation of tasks could be a subject area of further research interest by follow-on researchers.

E. Potential Benefits

A written proficiency-assessment test will provide essential feedback to Army contracting leaders by enabling them to measure individual task proficiency against established standards. Leaders could administer the PAT to newly arrived CCOs to gauge what tasks they are proficient in and what tasks they need work on. This knowledge will allow CCOs and their leaders to develop specifically tailored and individualized training programs to address weaknesses in the CCOs knowledge base, as demonstrated in the PAT results. Follow-on PATs can help the leader and CCO see progress in the individual training program. Using the PAT as the training feedback mechanism will allow leaders and individuals to determine if their training focus and methodology is accurate or should be adjusted. Moreover, the PAT will serve as valuable feedback to a commander on his unit's training program.

Leaders in the ECC will be able to measure a CCO's knowledge, skills, and capabilities and determine a CCO's preparedness to conduct duties during deployment. The PAT can serve as a capstone certification of an individual's deployment readiness at the conclusion of an extensive training program and prior to a scheduled deployment. The successful passing of the PAT will give the individual CCO confidence in his abilities to perform his mission. Moreover, it will serve as a validation to the individual's leaders that the CCO is ready to accomplish his mission.

A PAT may help ECC leaders assign CCOs to positions that match the CCO's experience and skill qualifications. The ECC has a variety of positions available for assignment, some coded for more experienced CCOs and some for entry-level CCOs. Two classic examples of positions are the CCO team member and CCO team leader. The first-line supervisors make detailed assignment adjustments at the unit level once a CCO has arrived and been assessed over time. A PAT would allow ECC leaders and first-line supervisors to distinguish between newly arrived or inexperienced CCOs and ones with more experience.

F. Limitations

The PAT, as developed, has several limitations. The limitations of the final version of the PAT and its accompanying answers include susceptibility to compromise by would-be test takers, limited ability to adapt to emerging trends in contingency contracting, inability to accurately reproduce the interface and interaction required of CCOs, and inability to measure experience accurately. Leaders within the ECC can issue the PAT with effective results if they understand these limitations and make accommodations beforehand to account for them. Test administrators should include these limitations in the test instructions.

The static nature of the final PAT as a written test makes it susceptible to compromise via memorization or copying and answer dissemination. While these potential problems are outside the scope of the research project, the final version of the test should nevertheless be a computerized version of the PAT that can be easily transported, administered, taken, graded, and evaluated. The precursor to such a digitized version is the written PAT presented in this research project. This product has written scenarios and accompanying questions that satisfy the task, conditions, and performance steps in the *SMCT*. The digitized version will have to present these questions for each scenario in a random manner. This random presentation of questions will limit test memorization and compromise and, by extension, the test's exploitation by would-be test takers.

The PAT developed in this research is designed to test proficiency in the 36 tasks listed in the *SMCT*. The *SMCT* signifies the fixed body of knowledge that the ECC has determined that a CCO must master to become a successful CCO. This PAT is developed as a measure of proficiency in that body of knowledge and is, therefore, not easily adaptable to emerging trends in contingency contracting. In researching the previously trained on CCO tasks, we found a varying degree of recommended tasks for CCO training over the past 15 years, many of which are not consistent with the 36 tasks in the *SMCT* (Tigges & Snyder, 1993; Lasch, 2002; Kirstein, 2003). As a result, we make the assumption that as the nature of warfare

changes, so too will the nature of contingency contracting change. It is possible that the tasks specified in the *SMCT* may change over time, as the nature of warfare, regulations, and deployments change. The fixed tasks in the PAT may become outdated and need revision. It is not within the scope of this project to evaluate or validate the 36 tasks listed in the *SMCT*. ECC leaders, PAT administrators, and CCOs should keep in mind the dynamic nature of contingency operations and their contracting needs. The research team recommends that the PAT become an evolving instrument, the content of which is managed in some form by the ECC. After its inclusion as a training tool for the ECC, obvious or glaring omissions not tested should be identified by the ECC for incorporation, and extraneous tasks tested should be identified for exclusion from future editions of the PAT. Periodic reviews and doctrinal revisions of the *SMCT* should similarly trigger PAT revisions. In the interim, ECC leaders and CCOs should be aware of emerging trends and develop solutions to test for tasks not listed or omit tasks from the test that are no longer relevant.

Contingency contracting is a skill that takes years to develop. An individual's development consists not just of completing educational requirements but also of gaining experience in making decisions in a dynamic and complex environment. Contingency contracting is as much an art as it is a science. A well-trained CCO makes the most appropriate decisions amidst a multitude of scenarios and variables. Whether in written format or as a computerized version, no form of test, unless it is performance-based, can accurately capture and measure the "art" of contingency contracting, developed over years of experience. No written or computerized test can reproduce the interface and interaction required to accomplish many of the 36 *SMCT* tasks. The PAT is limited in this respect. The research team recognizes that it cannot fully measure a CCO's level of proficiency. However, the PAT can be developed to measure a baseline of knowledge in the 36 tasks by presenting scenarios and questions from which the CCO must choose the right answer. Additionally, the PAT was developed by the research team to measure a certain

level of proficiency by creating scenarios and accompanying questions that will trigger experienced CCOs to search for the "best answer."

G. Methodology

The research team began the research by conducting a literature review of all pertinent contingency contracting literature. Contingency contracting is a niche subject area in the greater realm of contract management, executed almost exclusively by the Department of Defense (DoD). As such, we found very few published articles in established scholarly journals, practitioner journals, general-interest magazines, or other publications. Moreover, the specific nature of the project—to develop a test for CCOs—further narrowed the scope of applicable journals. The databases of the Defense Technical Information Center (DTIC) and Inside Defense provided the majority of articles germane to the research topic. The research team reviewed all pertinent and current articles covering contingency contracting to provide context in the development of the test.

The literature review chapter covers the history of contingency contracting before, and its evolution since, Operation Desert Storm (ODS). This evolution encompasses the drawdown of much of the Army's acquisition workforce during the early 1990s and the near simultaneous increase in operational requirements during that time following the terrorist attacks of September 11, 2001. Furthermore, the literature review covers the resultant fallout of these changes, culminating in the Gansler Commission findings and recommendations. By understanding contingency contracting from a historical perspective, the research team established a context for developing the PAT.

Critical to the literature review was the full understanding of the ECC as an organization. As the research sponsor and customer, the ECC required a final, usable PAT that would support their needs. This includes understanding the ECC's role, purpose, command structure, subunits, training methodology, and where in its growth-to-completion the ECC stands. The ECC was created recently as an Army

organization under the command of a one-star general in direct response to the Gansler Commission's recommendations to prepare, train, and provide skilled contracting personnel in support of US Army contingency operations (Gansler, 2007). Figure 8 shows the ECC's organization under the Army's Contracting Command. At the time of this writing, the ECC, as a new and large organization, is in the midst of growing and has yet to reach its final end-strength. It was important for us to understand where the ECC stood in terms of its development as an organization in order to understand how the PAT complemented the ECC's training focus and methodology and how the PAT could remain relevant and useful over time.

The *SMCT* represents the cornerstone of this research project since this single document represents the body of knowledge upon which the PAT was developed. The *SMCT* lists the 36 tasks and performance steps to successfully accomplish each task. The performance steps are, in essence, the correct answer for each accompanying task. The *SMCT* also articulates what role, in the greater scheme of Army training doctrine, the *SMCT* fills. In developing the PAT, it was critical for us to understand the tasks within the *SMCT*, how their proficiency is measured in the *SMCT*, and how this overall document fits in the ECC's training methodology.

Additionally, no official test to augment a US Army unit's training methodology would be complete without a thorough review of Army training doctrine. The research team reviewed *US Army Field Manuals (FM) 7-0*(*Training the Force)* (2002), *7-1* (*Battle Focused Training)* (2003), and *Army Regulation (AR) 350-1(Army Training and Leader Development)*. Collectively, these three documents represent the cornerstone of US Army training doctrine and methodology, and we used them to develop the PAT in context as a formal supplement to the *SMCT*.

Lastly, the research team conducted a review of testing and assessment theories. This review included theoretical application of assessment as a subset of the adult-learning model, core test principles, test construction and test blueprints,

Bloom's *Taxonomy*, and item writing as it relates to test construction. The knowledge we gained in reviewing test construction and evaluation-practices literature allowed us to choose the best practices to develop a valid and reliable proficiency-assessment test in a time-constrained environment that meets the needs of the Expeditionary Contracting Command and US Army CCOs.

In developing the PAT, the research team took each task and broke it down into its subcomponents of task, conditions, and performance steps. The tasks in the *SMCT* represent the 36 testable tasks of PAT that we used to measure proficiency. The conditions for each task "identify all the equipment, tools, references, job aids, and supporting personnel that the Soldier needs to use to perform the task in wartime" (DoA, 2009, September 22, p. 1-3). The performance steps in the *SMCT* are essentially the correct way to demonstrate proficiency. They are, in effect, the answers to the test. By using the task, conditions, and performance steps in the *SMCT*, the research team reverse-engineered each of the 36 tasks in the *SMCT* to create scenarios and questions for the answers of the test.

Once we developed a scenario or group of scenarios and their accompanying questions and answers, we sent the scenarios electronically to the ECC for vetting. The research team's sponsor and point of contact at the ECC distributed each of the scenarios to varying groups of experienced and senior leaders within the ECC. The research team's sponsor and the group of vetting officers are all experienced CCOs. This group developed the *SMCT* for the MOS 51C. Additionally, they vetted the scenarios to ensure that they satisfied the requirements for each of the tasks listed in the *SMCT*. If any of the tasks needed revision, the vetting group submitted any recommended changes to our sponsor, who, in turn, submitted them to the research team. The research team had no direct contact or correspondence with the vetting group of officers. All scenario submissions, changes, and revisions were handled through our sponsor on behalf of the research team. Upon completion of all 36 tasks, the research team compiled the 36 scenarios with accompanying questions and answers in a single Word document. While a computerized assessment test

was not a part of the scope of this project, the research team will continue to work towards converting the written version of the PAT to a computerized version.

H. Organization of Report

This report is organized in the following manner: Chapter I, Introduction, provides information on the background of this research project, lists the problem statement and research objectives, defines the scope and deliverables of the project, lists potential benefits and limitations of the project, and describes the methodology by which the research was conducted. Chapter II, Literature Review, covers all pertinent articles from scholarly journals, practitioner journals, general-interest magazines, and other publications on the topics of training and evaluating contingency contracting and on test construction and knowledge assessment. Chapter III, Contingency Contracting Framework, looks in detail at the organization responsible for the *SMCT*—the Expeditionary Contracting Command—and covers its history, organizational structure, and training focus. Additionally, this chapter describes in detail the *SMCT*, the document that represents the body of knowledge for the PAT. Chapter IV, PAT Development, describes the steps the research team took in developing the PAT. Lastly, Chapter V, Conclusion, summarizes the research project and makes recommendations for areas of further research.

I. Summary

US Army CCOs have been and continue to be a critical force multiplier in any contingency operation. Changes in the force structure of US Army acquisition, coupled with increasing demands on CCOs due to the changing nature of warfare, led to a shortage of qualified and capable CCOs for the US Army. This shortage caused the Army to rely heavily on sister Services to provide CCOs (Gansler, 2007). In response to the Gansler Commission findings, and in an effort to better support the warfighter, the US Army established the Expeditionary Contracting Command in Fort Belvoir, Virginia. This new command, under a one-star general's leadership, is

tasked with “providing skilled, trained, contracting personnel for the support of expeditionary forces” (Gansler, 2007, p. 52).

This new command, and other resultant changes of the Gansler Commission’s recommendations, resulted in a planned net increase of over 400 uniformed contracting officer positions (DoA, 2009a). Many of these positions were for CCOs, many of whom have no previous training in their new field of contracting, MOS 51C. To standardize training across the ECC for all CCOs, the ECC developed the *MOS 51C SMCT* as the body of knowledge needed by CCOs to be successful contracting officers during deployment. While this was a significant step in formalizing the ECC’s training methodology, no method of assessing performance of these tasks existed.

The research team, in partnering with the ECC, developed the Contingency Contracting Officer Proficiency-assessment Test (PAT). The PAT is based on the 36 tasks listed in the *SMCT*. The PAT consists of a scenario or scenarios for each of the 36 tasks. Each scenario has accompanying questions that measure Bloom’s cognitive domains of remembering, understanding, and, to a limited extent, application of knowledge of the tasks as defined by the performance steps. CCOs demonstrate proficiency in each task by successfully answering questions that meet the criteria in the performance steps.

The written version of the PAT has several limitations. As a static, written test, it is vulnerable to compromise and dissemination. Moreover, because it is based on the 36 tasks in the *SMCT*, it is not easily adaptable to emerging trends in contingency contracting. Lastly, a written test can never fully capture the “art” of contingency contracting. The learning curve for a CCO is too long and the variables too diverse to fully capture the nuance of possible choices leading to a “right” answer. Despite these limitations, a PAT will serve a critical role in the Army and ECC training methodology by providing the feedback mechanism to CCOs, ECC leaders, commanders, and trainers responsible for the professional development of CCOs.

The PAT developed in this research project will serve to augment the ECC's training methodologies by fulfilling a critical need in validating task proficiency in the 36 tasks listed in the *SMCT*. While not within the scope of this project, a digitized version of the PAT will make the PAT easily transferable and accessible. The products of this research project will provide critical feedback to ECC CCOs and their leaders by providing feedback on training and experience. The PAT will not only help the ECC continue to grow as an organization but will also help it grow its newly assessed CCOs into competent and capable CCOs who serve as force multipliers for US Army warfighters in current and future contingencies.

The next chapter, Literature Review, will cover all pertinent articles from scholarly journals, practitioner journals, general-interest magazines, and other publications on the topics of training and evaluating contingency contracting and on test construction and knowledge assessment. With respect to contingency contracting, the literature review focuses on the history of contingency contracting and previous training tasks to train CCOs. In the realm of test construction, the research team focused on the theoretical and academic study of the adult-learning model, core test principles, the practical application of test blueprints, item writing, and test construction, all within the construct of Bloom's *Taxonomy*.

THIS PAGE INTENTIONALLY LEFT BLANK

II. Literature Review

A. Introduction

Developing a proficiency-assessment test for contingency contracting officers brings together two highly specialized and disparate fields: contingency contracting and test construction and evaluation. Contingency contracting is a niche subject area within the greater realm of defense contracting. This literature review focuses on the history of contingency contracting, with an emphasis primarily on training and evaluation of CCOs. The research team wanted to understand trends and changes in CCO training and evaluation throughout modern military history in order to help build an effective proficiency-assessment test. We understood that developing a proficiency-assessment test would require extensive knowledge of test construction theory and practices. This research focuses on the theoretical and academic study of the adult-learning model, core test principles, practical application of test blueprints, item writing, and test construction within the construct of Bloom's *Taxonomy*. The research team used this knowledge to create the most effective and efficient proficiency-assessment test for the 36 tasks in the *SMCT*, given the limited time and expertise constraints of the research team.

A thorough review of related literature revealed an abundance of research efforts and published articles on contingency contracting–related topics. However, this literature review concentrates on the evolution of US Army contingency contracting as it relates to training, assessing, and preparing CCOs for deployment to hostile environments, a narrower field of study with less available research literature. Areas covered include the following: the history of contingency contracting, the problems and challenges of contingency contracting, the history of established tasks related to contingency contracting, and the evolution of contingency contracting since 9/11. By understanding contingency contracting from a historical perspective, the research team established a context for developing the PAT. Moreover, by reviewing the historical training tasks for CCOs, the research

team gained an understanding of the *SMCT* as the base document for the development of the PAT.

B. Contingency Contracting

US Army contingency contracting is a highly functional and narrowly focused area of study. As a result, there is little relevant literature to be extracted from civilian scholarly journals, practitioner journals, general-interest magazines, or other publications. The research team reviewed the National Contract Management Association's database for relevant articles. Comparable studies that specifically addressed the issue of contingency contracting training were very limited. The research team reviewed databases of the Office of the Inspector General with similar results. The databases of the Defense Technical Information Center (DTIC) and Inside Defense proved to be the best research databases to search for contingency contracting–related topics. A search of those two databases provided several contingency contracting–related studies conducted by graduate students at the Naval Postgraduate School (NPS) and the Air Force Institute of Technology (AFIT). These studies—along with Government Accountability Office (GAO) reports, the Gansler Commission report, and DoD and Air Force guidance—are the foundation of this portion of the literature review and study.

1. History of Contingency Contracting Pre-9/11

Contingency contracting officers have played an important role throughout modern military history. The origins of contingency contracting in the US military can be traced back to the American Civil War (Kirstein, 2003). Mason (1988) provides a timeline outlining the role of procurement personnel from that time period to 2003. Contracting officers of the 1860s, then called quartermasters, were directly assigned to army divisions fighting in the Civil War. As an integral part of the force, the quartermaster corps reduced the need for a logistical footprint to support the war effort (Mason, 1988).

During World War I and World War II, contingency contracting personnel played a diminished role because most supplies were shipped from the United States (Kirstein, 2003). Shipping supplies from the United States by watercraft proved both slow and inflexible in serving the needs of the warfighter. Goods often arrived long after the need for them had passed. This resulted in surpluses in some items and severe shortages in others. On a limited scale, the British carried out contracting tasks by providing surplus goods to supplement those arriving from the United States (Mason, 1988).

During the Korean War, contracting was used almost exclusively for providing all classes of supplies for the troops, marking the first time troops relied on contracting as an important procurement vehicle. The ability of local vendors to provide basic items reduced the need for shipments from the United States. Japanese and Korean contractors provided extensive support to the war effort. Local procurement of supplies resulted in a flexible supply chain that was responsive to the warfighters' needs (Kirstein, 2003). During the Vietnam conflict, the utilization of contracts to procure supplies and services greatly declined. Mason attributes this decline to the fact that the United States Congress never enacted a formal war declaration. Without a formal declaration of war, the Air Force did not have the political support or resources it needed to provide optimal support (Mason, 1988).

During Operation Desert Storm and Desert Shield (ODS), contingency contracting as we know it today was still maturing. Contingency contracting personnel were able to provide unprecedented support to the warfighters (Kirstein, 2003) but faced many challenges as they attempted to procure supplies and services. Their biggest challenge came from the government's own regulations (Luse, Madeline, Smith & Starr, 2005). Restrictions imposed by the *Federal Acquisition Regulation (FAR)*, *Defense Federal Acquisition Regulation Supplement (DFARS)*, and *Army Federal Acquisition Regulation Supplement (AFARS)* made contingency contracting operations more difficult than they needed to be. These regulations were not designed for contingency operations, and their applicability

under wartime conditions was vague (Luse et al., 2005). In his book *Moving Mountains: Lessons in Leadership and Logistics in the Gulf War*, General Pagonis (1992) described the daunting mission of contracting personnel, stating, "Our limited and precious transport space should be reserved for combat troops, and for these supplies, such as weapons and ammunition […]. Everything else was our problem to be found and contracted for" (Pagonis, 1992, p. 107). During ODS, most logistical needs were met, at least in part, by CCOs. Items and services contracted for included food, water, lodging, laundry, sanitation, communications, transportation, and miscellaneous equipment (Pagonis, 1992). Both the Army and the Air Force relied heavily on contract leases and procured goods and services. The lessons learned from Operation Desert Storm shaped current CCO practices and are being applied to meet the challenges of Operation Iraqi Freedom and Operation Enduring Freedom (Kirstein, 2003).

2. History of Contingency Contracting Post-9/11

The 21st century has brought about significant changes to the manner in which US Forces conduct operations overseas. The post–Cold War reduction in forces saw a decrease in acquisition-workforce professionals throughout the Army. From 1990 to 1996, the US Army saw its acquisition workforce decrease from approximately 10,000 personnel to nearly 5,500 personnel, where it remained through 2001 (Gansler, 2007). At the same time, the United States military, and in particular the Army, significantly increased the outsourcing of many jobs that were previously performed by uniformed Service members. As an indicator of complexity in contracting, the value of US Army contracts increased 331% from $23.3 billion in 1992 to $100.6 billion in 2006, and the number of contracts actions, as an indicator of workload, increased 654% from approximately 52,900 to approximately 398,000 over the same timeframe (Gansler, 2007). This decrease in contracting professionals and increase in contracting requirements led to many deficiencies in the Army's ability to conduct procurements for its warfighters during contingency operations.

Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF) have seen the largest use of contingency contracting by the Department of Defense in its history. Operations in Iraq and Afghanistan have demonstrated the demand that expeditionary military operations place on the contracting system and contracting personnel. A 2008 GAO report analyzed data from the DoD, Department of State, and United States Agency for International Development (USAID) on contracting activities in Iraq and Afghanistan for fiscal year (FY) 2007 and the first half of FY 2008. This report reviewed (1) the number and value of contracts and the extent to which they were awarded competitively, (2) the number of contractor personnel, including those performing security functions, and (3) the number of contractor personnel who were killed or wounded. The report showed that the United States had more civilian-contractor personnel in Iraq in 2008 than it did US Army soldiers. These contractor employees provide food services, interpretation services, communications, equipment repair, and other important services.

3. Problems and Challenges in Contingency Contracting

The shortfall in trained US Army contracting personnel in Iraq and Afghanistan and the exponential increase in contingency contracting procurement requirements led to failures highlighted in the 2007 report by the Gansler Commission. Officially called *Urgent Reform Required: Army Expeditionary Contracting*, the Commission on Army Acquisition and Program Management in Expeditionary Operations (led by Dr. Jacques S. Gansler, former Under Secretary of Defense (Acquisition, Technology & Logistics)) examined the Army's business processes as they relate to expeditionary contracting operations and highlighted the shortfalls and problems experienced by the Army prior to October 2007. The report found that some critical segments of the "Institutional Army" had not adapted to the expeditionary acquisition requirements, listing these "key failures" as "significantly contributing to the fraud, waste, and abuse in-theater" by Army personnel (Gansler, 2007, p. 1). Of these critical segments, two—training, education, and doctrine, and regulations and processes—are addressed in some measure by our development of

the proficiency-assessment test. The PAT is nested in newly developed doctrine, as found in the *SMCT*. Moreover, it provides a critical feedback mechanism for CCOs and their commanders on CCO training plans.

The Gansler Commission recommended four overarching changes for the Army:

1. Increase the stature, quantity, and career development of military and civilian contracting personnel (especially for expeditionary operations).
2. Restructure organization [Army] and restore responsibility to facilitate contracting and contract management in expeditionary and CONUS [Continental United States-based] operations.
3. Provide training and tools for overall contracting activities in expeditionary operations.
4. Obtain legislative, regulatory, and policy assistance to enable contracting effectiveness in expeditionary operations. (Gansler, 2007, p. 5)

The establishment of the Expeditionary Contracting Command is a direct result of recommendation number two. The ECC's development of the *SMCT* as a standard of knowledge for CCOs is in direct response to the Gansler Commission's third recommendation. In the Gansler report, the Commission further elaborates on their third recommendation by adding "Develop and field contract 'tools' needed for expeditionary forces including, but not limited to, sample contracts, statements of work, pre-agreed-to waivers, etc." (Gansler, 2007, p. 55). It is this recommendation that necessitates the development of the *SMCT* and, by extension, a proficiency-assessment test to measure against the standard of the *SMCT*.

While the Gansler Commission is the most widely referenced literature pertaining to failures in the Army's acquisition workforce, similar calls for better training of personnel had been highlighted by other governmental oversight agencies as well. In July 2007, David M. Walker, then Comptroller General of the United States, gave testimony before the Committee on Homeland Security and Governmental Affairs of the US Senate, highlighting systemic challenges to federal

acquisition and contracting. His statement, published in *GAO Report 07-1098T*, *Federal Acquisition and Contracting: Systemic Challenges Need Attention*, highlights four key acquisition challenges affecting agencies in the US Government. These challenges are as follows: (1) separating wants from needs, (2) establishing and supporting realistic program requirements, (3) using contractors in appropriate circumstances and contracts as a management tool, and (4) creating a capable workforce and holding it accountable (GAO, 2007). A proficiency-assessment test will assist the ECC in creating a capable workforce by testing their proficiency against an established standard.

While the Army has gone to great lengths to correct the deficiencies highlighted in the Gansler report (DoA, 2009a), many problems in the training of contracting personnel exist. For example, in March 2008, the GAO investigated the Army Contracting Agency's (ACA) Contracting Center of Excellence (CCE) to better understand the use of contractors as contract specialists. The primary concern of the GAO was that the Army's practice of hiring out contract specialists placed risk on the Army of entering into personal service contracts. The GAO identified that the CCE did not have a formal training program for its permanent government contracting specialists. CCE officials acknowledged the lack of a training program and the need to provide better training to their contracting specialists (GAO, 2008, March).

A similar study highlighting the lack of training in contracting personnel was published in June 2009 by the Commission on Wartime Contracting (CWC). The CWC was recently established by Congress to investigate fraud, waste, and abuse allegations surrounding contingency contracting in a wartime environment. The CWC provided an interim report, titled *At What Cost? Contingency Contracting in Iraq and Afghanistan*, that acknowledged the long-standing training problems of the federal contracting workforce, which made up of civilians and military personnel. The report states,

> *The ongoing analysis includes a review of the reports related to contingency contracting published between FY 2003 and FY 2009. A number of themes surface in these reports, such as staffing issues, inadequate internal controls, and the need for more training of personnel with contracting responsibilities. (CWC, 2009, p. 26)*

The repeated call for more and better training for CCOs by government oversight agencies appears to be more prevalent due to the wars in Iraq and Afghanistan. However, a literature review of previous training plans and CCO training tasks reveals that the development of CCO training has evolved with our military's missions over the past decades. The next portion of the literature review focuses on recommended CCO training tasks, which culminated with the development of the US Army's *Soldier's Manual of Common Tasks*.

4. Formalization of Contingency Contracting Officer Training and Tasks

Until recently, the US military lacked a formalized training program that adequately prepared CCOs for contingency contracting operations. In recent years, studies have identified the need for formalized training and have presented recommendations on the tasks in which CCOs need training to perform and the tasks that will best prepare CCOs for deployment to a contingency environment.

Mason (1988) identified the need for formal CCO training in his research. Using qualitative data derived from interviewing experienced contracting personnel, Mason investigated what, where, and how contingency contracting training was conducted in the past. Mason investigated existing legislation, regulations, and policies that affected the ability of CCOs to perform their duties, and he looked at potential changes that could be made to existing training methods to aid CCOs in carrying out contingency support missions. Even though Mason determined that there was a legitimate need for CCOs to be trained by their units prior to deployment, he did not present a formal training program. Instead, he presented a list of recommendations that focused on institutional, procedural, and policy changes to better support contingency contracting.

Killen and Wilson (1992) recommended the following topics for CCOs deploying with their units:

1. Overseas acquisition procedures
2. Local purchasing
3. Alternative methods of contracting
4. The economic variation provision for armed conflict
5. Base closure at the end of conflict

This list was the first of its kind in that it recommends special areas of emphasis in order for CCOs to be successful in a contingency environment. The list, as limited as it may appear today, provided a foundation for building realistic training programs for future CCOs (Kirstein, 2003).

Tigges and Snyder (1993) conducted further research in the field of contingency contracting. They presented a list of recommended CCO training topics based on the results of their study. Their study focused on the impressions CCOs had of the training they received prior to deployment. They conducted a survey and several interviews to collect data. Their population of interest was CCOs who deployed during Operation Desert Shield. Tigges and Snyder compiled a list of 50 topics and ranked them in descending order based on their significance. The following is a list of CCO training tasks by rank, as identified by Tigges and Snyder.

1. Services
2. Establishing communications lines
3. Using of SF 44, Purchase Order and Invoice Voucher
4. Resolving currency issues
5. Using of Blanket Purchase Agreements
6. Using Host Nation Support Agreements
7. Commodities

8. Obtaining a vehicle
9. Dealing with finance issues and procedures
10. Procurement integrity in a contingency
11. Arranging cash payments
12. Dealing with kickbacks
13. Understanding the makeup of local community
14. Dealing with transportation issues and procedures
15. Resolving customs issues
16. Establishing a pre-deployment listing of critical requirements
17. Evaluating security issues
18. Protecting funds under field conditions
19. Supply issues and procedures
20. Claims
21. Mutual support agreements with other nations
22. Civil engineering issues and procedures
23. Understanding legal authority under emergency conditions
24. Cultural issues
25. Obtaining interpreters
26. Anticipating customer requests
27. Chain of command in a contingency
28. Converting funds
29. Methods of control
30. Terminating for convenience
31. Finding a place to work

32. Services issues and procedures
33. Existing vendor source listings
34. Working with the other branches of the U.S. armed forces
35. Payments
36. Dress issues
37. Referrals to other in-theater organizations
38. Obligation authority (AF Form 616)
39. Writing Statements of Work
40. Home base support
41. Working with the US Embassy
42. Restrictive commanders
43. Establishing review and approval procedures
44. Record disposition
45. Legal limitations of decentralization
46. Proximity to critical organizations
47. Appropriation sources
48. Contract surveillance
49. Termination for default
50. Intermediate base support

Some of these topics are no longer an issue to CCOs, but many have been incorporated into training plans and contingency contracting courses offered to CCOs across all branches of the military.

Nash (1997) identified five skills essential to a contracting officer. These five skills, listed below, also apply in a contingency environment.

1. Knowledge of the rules of the game
2. Ability to exercise sound business judgment
3. Knowledge of strategy and tactics
4. Knowledge of the market
5. Ability to function successfully

For each skill, Nash analyzed the training provided at that time and suggested changes. Of the five skills, Nash argued that only one, knowledge of the rules of the game, received adequate training. His study suggested that contracting training at that time did not fully prepare contracting officers or CCOs for their positions. Furthermore, if contracting officers had all five skills, then they probably learned them on the job and not through a training program (Nash, 1997).

Lasch (2002) used a different approach to conduct his study. He identified 88 tasks that were regularly performed by CCOs in deployed environments. He then conducted a survey to obtain feedback from experienced CCOs and Functional Area Managers (FAMs) at the major command level (MAJCOM) from the Air Force. The two groups were asked to rank the 88 tasks based on how important they believed the tasks were and the frequency in which the tasks were performed. The result was a composite rank-ordered list of tasks based on inputs from the two surveyed populations that considered both the importance and frequencies of the tasks (Lasch, 2002). Lasch recommended the top third of the 88 tasks be included in CCO training programs. The following is a list of the top 35 training tasks of the 88 identified in the study (Lasch, 2002).

1. Simplified Acquisition Procedures
2. AF Form 9, Purchase Request
3. Installation Access for Contractors

4. Customer Education on Contracting Policies
5. Use of Automated Database/Spreadsheet to Record Purchases
6. Contract Modifications
7. SF 44, Purchase Order Invoice and Voucher
8. Blanket Purchase Agreements
9. Country Customs Procedures
10. Contract Modifications
11. Expedited Contracting Actions
12. SF 1449, Solicitation/Contract Order for Commercial Items
13. Shipment of Supplies Overseas
14. Use of Government Purchase Card
15. Solicit, Award, and Administer Service Contracts
16. After-Action Report
17. Standing Up a Contracting Office
18. SF 30, Amendment of Solicitation
19. Deployment/Contingency Kit Contents
20. Reviewing Statement of Work/Performance Work Statement
21. Solicit, Award, and Administer Commodity Contracts
22. Solicit, Award, and Administer Construction Contracts
23. Host Nation Support Agreements
24. Contract Closeout
25. Payments
26. Commander's In-brief
27. Funding the Government Purchase Card

28. Establishing Vendor Base
29. AF Form 616, Fund Cite Authorization
30. Status of Forces Agreement
31. Working with Finance/Defense Finance and Accounting Services
32. Writing Statement of Work/Performance Work Statement
33. Ethics Training
34. Terminations
35. Gratuity Training

There is no evidence that Lasch's list was incorporated into any CCO training program. The list addresses the concerns and challenges CCOs had at that time and provides relevant training topics, some of which are valid for the current contingency environment.

Kirstein's (2003) work is follow-on research to Lasch's thesis. Kirstein's study investigates how units conduct training and to what extent the recommended tasks are being addressed in training. Kirstein conducted interviews and surveys and reviewed archival training logs to capture the data for his study. His study consisted of a pre-test, which was conducted through interviews, and a two-phase survey. Phase one described the purpose of the study, and phase two involved the collection of surveys from the population of interest.

Kirstein obtained training logs and plans from the participants' units. These logs provided insight into the content of training and allowed the researcher to investigate which of the recommended tasks from Lasch (2002) were included in unit training programs across the Air Force (Kirstein, 2003). Kirstein's analysis found that a number of units in some of the commands did not conduct any formal CCO training, clearly indicating that many CCOs were not receiving training in the top 30 tasks identified by Lasch (2002). Additionally, the units that conducted training did so on approximately seven of Lasch's 30 tasks.

Kirstein's review of training logs also revealed that unit-level training alone was not preparing CCOs for their deployments. These results indicated that the content and quality of training was inconsistent across contingency contracting units. The study revealed that most units had nearly complete control over their own training programs. While this allowed a great deal of flexibility, there was no way of ensuring the adequacy and consistency of training (Kirstein, 2003). Responses to Kirstein's survey indicated that the typical unit conducted unit-level CCO training for one hour each month. The training consisted of lectures and was not realistic. Kirstein recommended that the Air Force both improve training programs and provide relevant training material for future unit-level CCO training programs. The following list of tasks is a list of Kirstein's recommendations. Tasks common to both Lasch's and Kirstein's lists are depicted in bold below.

1. **SF 44**
2. **Blanket Purchase Agreements**
3. **Use of Government Purchase Card**
4. Cultural Training
5. Contract Types
6. **Payments**/Funding
7. **Customer Education on Contract Policies**
8. Forms
9. CCO Responsibilities
10. **Solicit, Award, and Administer Construction Contracts**
11. **AF Form 9/Purchase Orders/Requests**
12. Prioritization
13. General Procedures
14. Appendix CC Overview

15. Working with Finance

16. Documentation

17. Inter-service Procedures

18. Deployment/Contingency Kit Contents/Usage

19. Solicit, Award, and Administer Service Contracts

20. Commander's In-brief

The above list depicts 20 of the 34 tasks recommended in Kirstein's study. His recommendations were based on feedback from CCOs who had made numerous deployments to contingency environments; they continue to be relevant today. When combined with the list of tasks recommended by Lasch (2002), the list of tasks recommended by Kirstein provides the basis for a good contingency contracting training plan. The methodologies were somewhat different, but the two studies arrived at a similar conclusion, with almost half of the recommended tasks being present in both studies.

5. Other Established Training Methods

The literature reviewed thus far pertains to studies conducted by members of the Air Force and the Army as well as the Gansler Commission report, which addressed the problems plaguing contingency contracting in the Army. Burger, Kehr, and Wobensmith (2003) conducted a study sponsored by the Marine Corps Institute (MCI) on how to assist the Marine Corps in training its contracting personnel in preparation for deployment to a contingency operation. Burger, Kehr, and Wobensmith (2003) identified five causes affecting contingency contracting training in the Marine Corps. These causes are listed below.

Cause 1. No formal school training
Cause 2. No web-based or self-guided study
Cause 3. No direct CON 234 supervision
Cause 4. No in-house contingency contracting training
Cause 5. Small contracting specialist population

Burger, Kehr, and Wobensmith (2003) included elaborate recommendations for each one of these causes. For Cause 1, they recommended Marine Corps CCOs attend the entry-level Air Force Contracting School. At the time of the study, the Air Force was the only Service that had a formal technical school where enlisted personnel could be trained in the contracting career field. Attending the Air Force Contracting School would allow enlisted CCOs to get training in contract policies, best practices, and guidelines to perform their jobs. For Cause 2, the study group recommended the implementation of a contingency contracting correspondence manual that they, in conjunction with the MCI, developed and published as part of their report. For Cause 3, the group recommended a more proactive role to ensure that all CCOs attended CON 234, Contingency Contracting Course. They recommended that instead of only tracking who completed the course, the Logistics Branch at Headquarters Marine Corps (HQMC)—the branch of the Marine Corps that oversees the USMC CCOs—should take a more centralized approach to managing the available slots and ensuring more CCOs attend CON 234. For Cause 4, the group recommended the establishment of a Mobile Training Team (MTT) made up of experienced CCOs. The team would travel to the locations where the majority of CCOs were located and provide contingency contracting training.

6. Defense Acquisition University CON 234, Contingency Contracting Course

The Defense Acquisition University (DAU) provides acquisition training and career management to the contingency contracting and procurement community. The DAU mission is to "provide practitioner training, career management, and services to enable the Acquisition Technology and Logistics (AT&L) community to make smart business decisions and deliver timely and affordable capabilities to the war-fighter" (DAU, 2008). The DAU offers 102 formal courses, 22 of which are in the field of contracting; however, only CON 234 addresses contingency contracting.

CON 234 is a nine-day course intended to train and develop skills in contingency contracting to support joint forces in all military operations (DAU, 2008).

While some CCOs who have attended CON 234 categorize it as a great course that goes a long way in preparing CCOs for deployment to a contingency environment, others complain that the course is too short and too broad (Burger et al., 2003).

7. Contingency Contracting Officer Handbook

Contingency Contracting: A Joint Handbook for the 21st Century was prepared by the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics (OUSD (AT&L)), Defense Acquisition, Technology, and Logistics contingency contracting staff; the Defense Acquisition University; representatives from the United States Army, Navy, Marine Corps, and Air Force; and the Air Force Logistics Management Agency (DPAP, 2008). The CCO handbook serves as a guide to assist contingency contracting officers in preparing for wartime and peacetime deployments or exercises and performing the duties of a deployed contingency contracting officer.

8. Soldier's Manual of Common Tasks

The *Soldier's Manual of Common Tasks (SMCT)* was created by the Expeditionary Contracting Command (ECC) for soldiers and officers holding Military Occupational Specialty (MOS) 51C as a way to focus on specific tasks that will prepare CCOs in the ECC for their war-time mission. The *SMCT* contains an MOS training plan that provides information needed to plan, conduct, and evaluate individual training (DoA, 2009, September 22). The *SMCT* includes a list of 36 tasks divided into four subject areas that are designed to prepare CCOs to accomplish their mission in any contingency environment. Chapter III of this report describes in greater detail the development of the *SMCT* and the establishment of the ECC.

The establishment and standardization of training tasks for CCOs in the *SMCT* will help subordinate units and individual CCOs within the ECC focus their training efforts prior to deployment. This body of knowledge is a significant step in standardizing the pre-deployment training for CCOs and preparing them for their mission once deployed. To supplement this training, an appropriate performance

assessment tool is needed to measure performance of these tasks. The ECC currently lacks a standardized method of measuring individual skill and task proficiency in its CCOs. A written proficiency-assessment test will allow leaders in the ECC to measure individual task proficiency against established standards, determine each CCO's preparedness to conduct duties during deployment, determine appropriate CCO assignment, and develop individualized training programs for CCOs.

Developing a proficiency-assessment test requires extensive knowledge of test-construction theory and practices. The research team, comprised of professional soldiers, has no academic background or experience in test construction. However, training soldiers and assessing their performance is a core competency of any professional Army officer. In this respect, the research team has practical experience. In an effort to round out our practical experience with grounded theoretical and academic principles and to assist in the development of the PAT, the research team reviewed US Army training doctrine, as it relates to training and assessment. Additionally, the research team conducted a review of assessment as a subset of the adult-learning model, core test principles, test construction and test blueprints, Bloom's *Taxonomy*, and item writing, as it relates to test construction. This knowledge base will assist the research team in developing a valid and reliable proficiency-assessment test to meet the needs of the Expeditionary Contracting Command and US Army CCOs.

C. Testing and Evaluation

This portion of the literature review will primarily review test and assessment theory. At the beginning of our research, the research team set out to determine (1) the role of assessment in a professional workforce, (2) the core test principles, and (3) the basic steps and procedures to test construction.

1. Training and Assessment

Field Manual (FM) 7-0 (Training the Force), FM 7-1 (Battle Focused Training), and Army Regulation 350-1 (Army Training and Leader Development) are three of the main documents that outline Army training doctrine. FM 7-0 establishes Army training doctrine while FM 7-1 is designed to help unit commander's develop and execute training programs (DoA, 2002). The authors reviewed those documents to understand how this project fits within the Army training methodology and comparative adult-learning theory. The Army training and leader-development model is depicted in Figure 1.

Figure 1. Army Training and Leader Development Model
(DoA, 2002, p. 1-6)

FM 7-0 describes this model in the following manner:

> Leader Development is a lifelong learning process. The three core domains that shape the critical learning experiences throughout a soldier's and leader's career are the operational, institutional, and self-development domains. Together, these domains interact using feedback and assessment from various sources and methods to maximize warfighting readiness. Each domain has specific, measurable actions that must occur to develop our leaders. The operational domain includes home station training, combat training center rotations, joint training exercises, and operational deployments that satisfy national objectives. Each of these actions provides foundational experiences for soldiers, leaders, and unit development. The institutional domain focuses on educating and training soldiers and leaders on the key knowledge, skills, and attributes required to operate in any environment. It

> includes individual, unit and joint schools, and advanced education. The self-development domain, both structured and informal, focuses on taking those actions necessary to reduce or eliminate the gap between operational and institutional experiences. Throughout this lifelong learning and experience process, there is formal and informal assessment and feedback of performance to prepare leaders for their next level of responsibility. Assessment is the method used to determine the proficiency and potential of leaders against a known standard. (DoA, 2002, p. 1-5)

The proficiency-assessment tool developed in this project can help assess and coordinate individual training within the institutional and self-development domains of the Army training model.

Assessment is core to adult-learning processes. The adult-learning model includes four phases (Knowles, Holton & Swanson, 1998). The first phase is to determine what learning objectives are desired and to set learning achievement goals. The second phase creates a strategy and allocates resources to accomplish the learning objectives. Step three involves implementing the learning strategy, and step four assesses the attainment of the learning goal. Figure 2 depicts the theoretical foundation of adult learning.

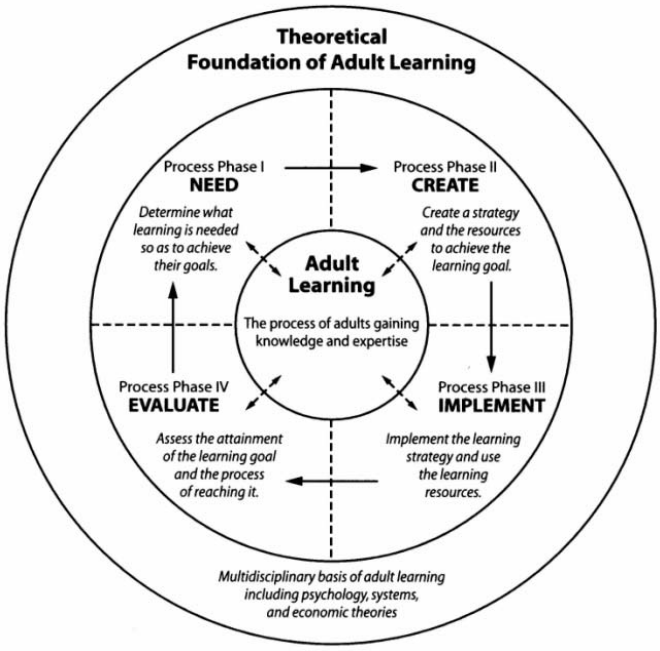

Figure 2. Theoretical Foundation of Adult Learning
(Knowles, Holton & Swanson, 1998, p. 125)

Army training doctrine considers assessment of a commander's responsibility (DoA, 2002). It is ultimately the commander who must determine if her unit and soldiers are prepared to accomplish their operational mission. The commander utilizes multiple evaluation tools to determine and report mission readiness. These evaluations can be classified as informal, formal, internal, or external.

Assessment is a continuous process and is considered both the end and the beginning of the training-management cycle. The Army's planning process for training is divided into four steps: training assessment, training strategy, commander's guidance, and training plans. Figure 3 depicts the Army's planning process for training.

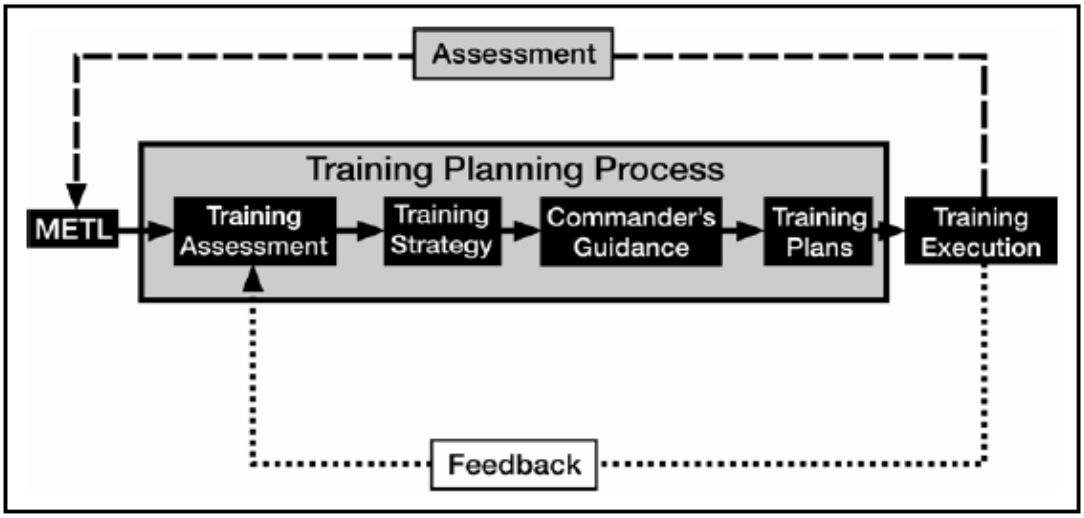

Figure 3. Army Training Planning Process (Training Assessment)
(DoA, 2003, p. 4-4)

Before developing a training plan, a commander evaluates the individual battle tasks that support overall unit mission essential tasks. Mission Essential Task Lists (METL) are collective tasks that combine individual and leader battle tasks. Tasks within the 51C *SMCT* are examples of individual tasks that support these

overall mission-essential tasks. Individual- and mission-essential tasks are rated in *FM 7-1* as follows:

> ASSESSMENT RATINGS
>
> The commander's training assessment is required for each METL task. Task proficiency is rated as—
>
> "T" (trained): The unit is trained and has demonstrated proficiency in accomplishing the task to the Army standard. The leader judges task performance to be free of significant shortcomings. Training on "T" tasks is designed to sustain proficiency on that task.
>
> "P" (needs practice): The unit can perform the task with some shortcomings. Performance has demonstrated that the unit does not achieve the standard without some difficulty or has failed to perform some task steps to standard. The shortcomings are not severe enough to require complete retraining. Only refresher training is required.
>
> "U" (untrained): The unit cannot demonstrate an ability to achieve wartime proficiency. The leader prepares a comprehensive plan to train all supporting tasks not executed to standard. Unless the task is a new METL task, a rating of "U" indicates a serious training deficiency and reflects on the unit's wartime readiness posture.
>
> EVALUATION RATINGS
>
> Evaluation ratings are given for specific task proficiency and should not be confused with leader assessments. Evaluation ratings are ratings assigned directly to the performance of a specific task or component steps of a task. The standard evaluation ratings, discussed further in chapter 6, are as follows:
>
> "GO": The task or performance step of a task was performed to standard. A rating of GO is normally awarded if all steps in the task are passed.
>
> "NO GO": The task or any performance step in the task was not performed to standard. (DoA, 2003, p. 4-6)

How commanders develop a training plan and evaluate individual tasks is relevant to this project because it reveals ways in which commanders might consider using the proficiency-assessment test developed in this project. It is not the research team's intent to develop an assessment tool for commanders to

automatically determine specific battle-task ratings as defined above. By understanding this construct, the research team was able to write specific and relevant test instructions.

It is the hope of the research team that the assessment tool developed in this project will satisfy some of the requirements outlined in Army training doctrine to establish individual self-development programs. The following excerpt from *FM 7-0* describes the role of assessment in establishing individual self-development programs:

> Self-development starts with an assessment of individual strengths, weaknesses, potential, and developmental needs. Commanders and leaders provide feedback that enables subordinates to determine the reasons for their strengths and weaknesses. Together, they prioritize self-development near-term and long-term goals and determine courses of action to improve performance. Self-development is—
>
> A planned process involving the leader and the subordinate being developed. It enhances previously acquired skills, knowledge, behaviors, and experience; contributes to personal development; and highlights the potential for progressively more complex and higher-level assignments. Self-development focuses on maximizing individual strengths, minimizing weaknesses, and achieving individual personal and professional development goals.
>
> Initially very structured and generally narrow in focus. The focus broadens as individuals understand their strengths and weaknesses, determine their individual needs, and become more experienced. Each soldier's knowledge and perspective increases with experience, institutional training, and operational assignments, and is accelerated and broadened by specific, goal-oriented self-development actions. (DoA, 2003, p. 1-12)

The PAT developed during this research can be used by individual soldiers—and their leaders and commanders—to conduct an assessment of that soldier's strengths and weaknesses in the *SMCT* tasks. These assessments can then be used to design follow-on training. The PAT can measure the success of this follow-on training designed as a result of that assessment.

The six core adult-learning principles should be considered when establishing a self-development program (Knowles, Holton & Swanson, 1998). Figure 4 depicts the six core adult-learning principles:

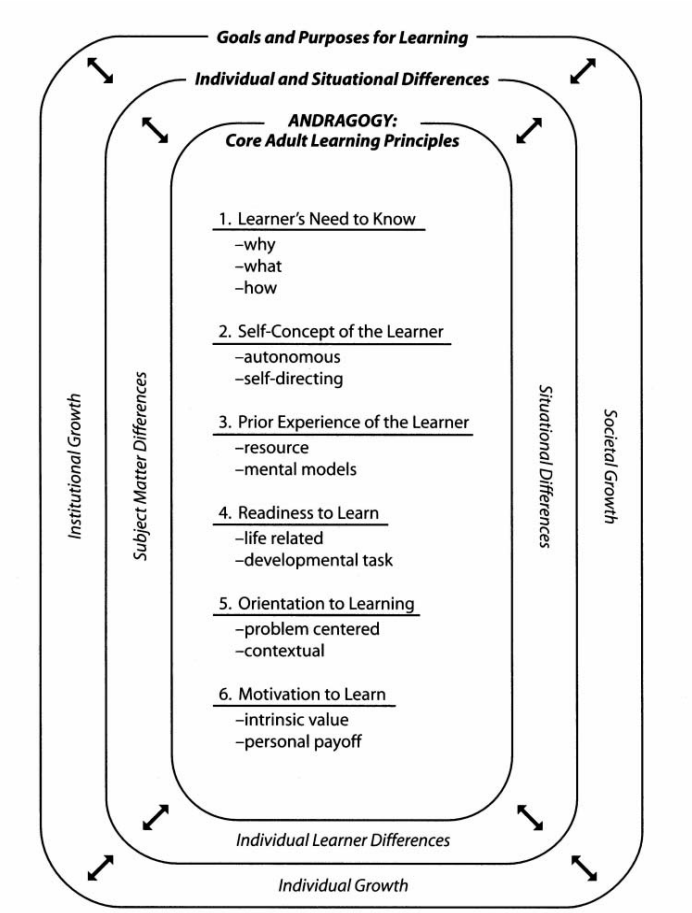

Figure 4. Core Adult Learning
(Knowles, Holton & Swanson, 1998, p. 4)

Knowles, Holton and Swanson expand upon the concept of the adult-learning model and provide eight steps to guide field supervisors and subordinates to develop a learning contract. These steps are as follows:

1. Diagnose your learning needs,
2. Specify your learning objectives,
3. Specify learning resources and strategies,

4. Specify evidence of accomplishment,

5. Specify how evidence will be validated,

6. Review the contract,

7. Carry out the contract, and

8. Evaluate your learning.

A learning contract should be oriented in such a way that the learner assumes a major responsibility to ensure that the contract is relevant (Piskurich, Beckschi & Hall, 2000). Piskurich et al. provides the following reasons to justify the increased use of learning contracts to satisfy training and development objectives:

1. To provide more appropriate learning for individuals with diverse backgrounds, experiences, and learning styles;

2. To meet the needs of learners in specialized areas;

3. To meet needs of learners in rapidly changing fields when no appropriate curriculum or training is available;

4. To meet the needs of learners at a distance;

5. To save training dollars; and

6. To develop self-directed, reflective, continuing learners who can contribute to the success and growth of the organization.

Several methods and models are available for supervisors to evaluate implemented training programs (Phillups, 1997; Piskurich, Beckschi & Hall, 2000). Assessment should occur at every level of training development.

This section of the literature review examined how assessment fits within training and leadership development models, both inside and out of the military. Additionally, we reviewed relevant information in developing learning contracts and adult learning principles. This information is relevant for establishing a context of how assessments are used towards self-development programs as well as for

serving as a possible guide for the research team during the development and publication of the commander's assessment-tool guide.

The literature review until now has served to provide the research team with the historical background of contingency contracting training and input on where a test would fit in a training methodology. The following sections of the literature discuss the core test principles, test-construction methods, test blueprints, and item writing. These sections deal directly with the mechanics of writing the test. This section provided the research team with the knowledge of how to develop and write the questions for the PAT.

2. Core Test Principles

Tests can be categorized into numerous types. Examples of these categories are intelligence, ability, personality, objective, projective, and attitude, among others (Kline, 1986). Tests are specific tools designed and administered to serve a specific function. These functions can be categorized into three areas: prediction, assessment, and trait measurement (Nunnally, 1972). Tests designed to a predictive function attempt to forecast how an individual will behave in a particular situation. An example of this test might be a college placement exam. Assessment tests do not attempt to predict future behavior but rather directly measure the performance of an individual at a specific point in time. The level of performance measured depends upon the type of test developed and administered. Trait-measurement tests are designed to measure specific psychological traits, such as anxiety or depression.

Another way to categorize tests is to classify them as either a criterion-referenced test or a norm-referenced test (Marshall & Hales, 1972). Criterion-referenced tests attempt to determine if an individual has mastered a subject area in a specific learning objective. This measurement could be interpreted in a variety of ways, such as deciding if an individual is ready to move to another subject or to a higher level of mastery. This type of test is often used as a diagnostic instrument.

Norm-referenced tests attempt to measure an individual against a referenced norm, such as a group of colleagues or other professionals. This type of testing attempts to rank students on a scale of magnitude within the distribution of a specific population. The proficiency-assessment test developed within the scope of this project can be classified as a criterion-referenced test.

Tests involve three key players: the test user, test writer, and test taker. The *Standards for Educational and Psychological Tests* defines a test user as one who chooses tests to give, interprets scores, or makes decisions based on test scores. Dependent upon the use or function of the test, the following standards are considered essential for test users:

1. Test user should have a general knowledge of measurement principles and of the limitations of test interpretations, and how well they match the qualifications required to use a specific test.

2. A test user should know and understand the literature relevant to the test she uses.

3. One who has the responsibility for decisions about individuals or policies that are based on test results should have an understanding of psychological or educational measurement.

4. Principal test users within an organization should make every effort to be sure that all those in the organization who are charged with responsibilities related to test use and interpretation have received training appropriate to those responsibilities.

5. Tests users should seek to avoid bias in test selection and interpretation or even the appearance of discriminatory practice.

6. Institutional test users should establish procedures for periodic internal review of test use.

7. The choice or development of tests or other assessment procedures should be based on clearly formulated goals and hypothesis.

8. A test user should consider more than one variable for assessment and the assessment of any given variable by more than one method.

9. In choosing an existing test, a test user should relate its history of research and development to his intended use of the instrument.

10. A test user is expected to follow carefully the procedures described in the test manual.

11. The test administrator is responsible for establishing conditions, consistent with the principle of standardization, that enable each examinee to do his or her best.

12. The test user shares with the test developer or distributor a responsibility for maintaining test security.

13. A test score should be interpreted as an estimate of performance under a given set of circumstances. It should not be interpreted as some absolute characteristic of the examinee or as something permanent. (APA, 1974, p. 58-65)

Anastasi (1982) outlines two main reasons to control the use of a test: (1) to ensure that it is administered by a qualified examiner, and (2) to protect the test content from being compromised, which would invalidate the assessment. A qualified examiner must essentially know how to select the right test, administer the test, and properly interpret the results.

Every text on measurement theory and test construction that the research team reviewed listed reliability and validity as two essential test characteristics. Some references added additional characteristics such as objectivity, balance, fairness, and practicality to the list (Marshall & Hales, 1972). Another author considers efficiency as a characteristic and highlights current theories and models designed to improve test efficiency (Brennan, 2006). For simplicity, this literature review focuses on reliability and validity as the two main test characteristics.

Reliability, in essence, measures the consistency of a test. The more consistent a test is, the higher the probability the same individual will obtain a similar score when retesting on an identical test or equivalent version (Anastasi, 1982). Statistically, there are multiple methods to derive reliability:

> Reliability can be defined in several ways—such as the proportion of observed-score variance that is true-score variance, the squared correlation between true scores and observed scores, or the correlation between observed scores on two parallel tests. Several estimates of reliability are widely used, including test/retest, parallel-forms, alternate forms, and internal-consistency estimates. (Allen & Yen, 2001, p. 91)

Test developers want to minimize the effects of chance on reliability (Wood, 1960). Wood identifies the following three sources of chance variation:

1. Scorer unreliability occurs when the scorer through subjectivity or bias induces variability into an assessment or testing process.

2. Content unreliability occurs from a poor sampling of content. It typically occurs where a score of an individual depends heavily on the sample of questions selected from a test speculation.

3. Temporal unreliability includes a variety of factors that would explain how an individual's score varied at different times. One example of this is the varying ability of an individual to remember responses from the last test when taking the second test.

According to Kline (1986), other recommended sources of unreliability include guessing, test length, poor test instructions, or simply a sick or ill test subject.

Validity is how well a test meets its designed function. A test might be extremely reliable yet, at the same time, be invalid. It is never acceptable to accept a test as valid until something proves it as such (Nunnally, 1972):

> Validity can be assessed in several ways, depending on the test and its intended use. The three major types of validity are content validity, criterion-related validity and construct validity. Determinations of criterion-related validity and construct validity involve the calculation and examination of correlations or other statistics. Content validity, however, does not involve any statistical calculations. (Allen & Yen, 2001, p. 95)

Content validity is achieved through an individual, subjective judgment. Essentially, it is established when someone examines the test and determines it correctly measures what it was designed to measure. This type of validity is more prone to error and should not be relied upon as the sole determination of a test's validity (Allen & Yen, 2001). The research team recognizes the limitations of content

validity, but we considered it the most achievable type of validity within the scope of the project and a primary concern during test construction. Nunnally & Bernstein (1978) discuss content validity in the following way:

> Rather than test the validity of measures after they are constructed, one should ensure validity by the plan and procedures of construction […]. The validity of the measure is judged by the character of the plan and by the apparent skill with which the plan has been carried out. If it is agreed by most potential users of the test, or at least by persons in positions of responsibility, that the plan was sound and well carried out, the test has a high degree of content validity.
>
> The simple example above illustrates the two major standards for ensuring content validity: (1) a representative collection of items and (2) "sensible" methods of test construction. (pp. 80-81)

Criterion-related validity is derived by establishing a correlation between a test score and a specific criterion's score. Criterion-related validity is interchangeable with the term *predictive validity* (Nunnally & Bernstein, 1978). Brenan (2006) describes the evolution of all three models, the limitations of each model, and the methods of estimation. It is not the research team's intention to describe the science of validity in detail but rather to identify it as a core test principle and recognize its relevance towards the assessment tool developed in this project.

The *Standards for Educational and Psychological Tests* provides essential standards for test developers to achieve both reliability and validity. Many of these standards are achieved throughout the entire test-construction process. Test creators take steps to re-evaluate validity and reliability using test trials and statistical analysis before a test is published in its final form.

3. Test Construction

This section of the literature review examines recognized steps of test construction and identifies rules and procedures for some of the key steps. Allen & Yen (2001) identify the following basic steps in test development**:**

1. Plan the test. During this step, developers establish a test map or test blueprint to document what areas the test items will cover.

2. Write the test items or questions.

3. Administer all written test items to a sample population. Generally, a minimum of 50 persons is reasonable, but several hundred is optimal. The sample population should represent the population for which the test was developed.

4. Conduct item analysis using the results of the sample. During this step, test developers refine test items and eliminate those that are invalid.

5. Administer the revised tests to another sample population and continue steps 2-4 until a satisfactory test is produced.

Downing and Haladyna (2006), list twelve steps for effective test development:

1. Overall plan,

2. Content definition,

3. Test specifications,

4. Item development,

5. Test design and assembly,

6. Test production,

7. Test administration,

8. Scoring test responses,

9. Passing scores,

10. Reporting test results,

11. Item banking, and

12. Test technical report. (p. 5)

Building a test blueprint and item writing are two of the common steps found between these test-development models that we intend to execute within the scope of this project. What follows in this literature review is a more detailed look at these

steps, and in Chapter IV of this project, we identify what procedures we followed to develop the assessment tool.

4. Test Blueprints

Test blueprints act as a road map for test construction in laying out which subject areas the test developer wants to test and at what cognitive domain the subject area should be tested. Brennan outlines the importance of blueprints when developing a test:

> Test specifications are often called blueprints because they specify how the test or pool is to be constructed. […] Specifications for a test form or pool describe its content, form, and functional requirements. (Brennan, 2006, p. 315)

At a minimum, test blueprints or specifications should contain the following information (Downing & Haladyna, 2006):

1. The type of testing format to be used (selected response versus constructed response),
2. The total number of test items as well as the type or format of test items,
3. The cognitive classification system to be used,
4. Whether or not the test items or performance prompts will contain visual stimuli,
5. The expected item scoring rules,
6. How test scores will be interpreted (norm or criterion-referenced), and
7. The time limit for each item. (p. 9)

Subject-matter experts and administrative officials should review test blueprints prior to implementation (Nunnally & Bernstein, 1978).

Several texts recognized the use of Bloom's *Taxonomy of Educational Objectives* as a common method to classify cognitive domains within a test blueprint

(Downing & Haladyna, 2006; Brennan, 2006; Marshall & Hales, 1972; Kline, 1986). The research team uses this taxonomy during the test-specification step, so a brief summary of Bloom's *Taxonomy* is included here.

Bloom developed a taxonomy of educational objectives in order to assist teachers, professionals, and researchers in categorizing educational goals and to guide them with curricular and evaluation problems (Bloom, 1956). His work divided the cognitive domain into six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. He provided examples of illustrative test items within each domain. His classic work was revised by several of his pupils (Anderson et al., 2002). Their revised version of Bloom's taxonomy is depicted in Figures 5 and 6. Anderson et al. establish a knowledge dimension that is divided into four categories—factual, conceptual, procedural, and meta-cognitive—and suggest using a taxonomy table as an assessment-development tool. Other authors demonstrate the use of similar matrices to develop blueprints within a taxonomy construct (Marshall & Hales, 1972; Downing & Haladyna, 2006).

Categories & Cognitive Processes	Alternative Names	Definitions and Examples
1. REMEMBER—Retrieve relevant knowledge from long-term memory		
1.1 Recognizing	Identifying	Locating knowledge in long-term memory that is consistent with presented material (e.g., Recognize the dates of important events in U.S. history)
1.2 Recalling	Retrieving	Retrieving relevant knowledge from long-term memory (e.g., Recall the dates of important events in U.S. history)
2. UNDERSTAND—Construct meaning from instructional messages, including oral, written, and graphic communication		
2.1 Interpreting	Clarifying, paraphrasing, representing, translating	Changing from one form of representation (e.g., numerical) to another (e.g., verbal) (e.g., Paraphrase important speeches and documents)
2.2 Exemplifying	Illustrating, instantiating	Finding a specific example or illustration of a concept or principle (e.g., Give examples of various artistic painting styles)
2.3 Classifying	Categorizing, subsuming	Determining that something belongs to a category (e.g., concept or principle) (e.g., Classify observed or described cases of mental disorders)
2.4 Summarizing	Abstracting, generalizing	Abstracting a general theme or major point(s) (e.g., Write a short summary of the events portrayed on a videotape)
2.5 Inferring	Concluding, extrapolating, interpolating, predicting	Drawing a logical conclusion from presented information (e.g., In learning a foreign language, infer grammatical principles from examples)
2.6 Comparing	Contrasting, mapping, matching	Detecting correspondences between two ideas, objects, and the like (e.g., Compare historical events to contemporary situations)
2.7 Explaining	Constructing models	Constructing a cause-and-effect model of a system (e.g., Explain the causes of important 18th-century events in France)
3. APPLY—Carry out or use a procedure in a given situation		
3.1 Executing	Carrying out	Applying a procedure to a familiar task (e.g., Divide one whole number by another whole number, both with multiple digits)
3.2 Implementing	Using	Applying a procedure to an unfamiliar task (e.g., Use Newton's Second Law in situations in which it is appropriate)

Figure 5. Revised Bloom's Taxonomy of Learning Objectives
(Anderson et al., 2002, p. 66)

Categories & Cognitive Processes	Alternative Names	Definitions and Examples
4. ANALYZE—Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose		
4.1 Differentiating	Discriminating, distinguishing, focusing, selecting	Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material (e.g., Distinguish between relevant and irrelevant numbers in a mathematical word problem)
4.2 Organizing	Finding coherence, intergrating, outlining, parsing, structuring	Determining how elements fit or function within a structure (e.g., Structure evidence in a historical description into evidence for and against a particular historical explanation)
4.3 Attributing	Deconstructing	Determine a point of view, bias, values, or intent underlying presented material (e.g., Determine the point of view of the author of an essay in terms of his or her political perspective)
5. EVALUATE—Make judgments based on criteria and standards		
5.1 Checking	Coordinating, detecting, monitoring, testing	Detecting inconsistencies or fallacies within a process or product; determining whether a process or product has internal consistency; detecting the effectiveness of a procedure as it is being implemented (e.g., Determine if a scientist's conclusions follow from observed data)
5.2 Critiquing	Judging	Detecting inconsistencies between a product and external criteria, determining whether a product has external consistency; detecting the appropriateness of a procedure for a given problem (e.g., Judge which of two methods is the best way to solve a given problem)
6. CREATE—Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure		
6.1 Generating	Hypothesizing	Coming up with alternative hypotheses based on criteria (e.g., Generate hypotheses to account for an observed phenomenon)
6.2 Planning	Designing	Devising a procedure for accomplishing some task (e.g., Plan a research paper on a given historical topic)
6.3 Producing	Constructing	Inventing a product (e.g., Build habitats for a specific purpose)

Figure 6. Revised Bloom's Taxonomy of Learning Objectives
(Anderson et al., 2002, p. 67)

5. Item Writing

Items, or rather questions, can be divided into two general formats (Osterlind, 1997). Selected-response items occur when the examinee is given both the problem and the correct solution. The examinee must then choose the correct solution over other incorrect solutions provided as options. Figure 7 depicts an

example of this type of format and gives the reader an idea of test-item nomenclature.

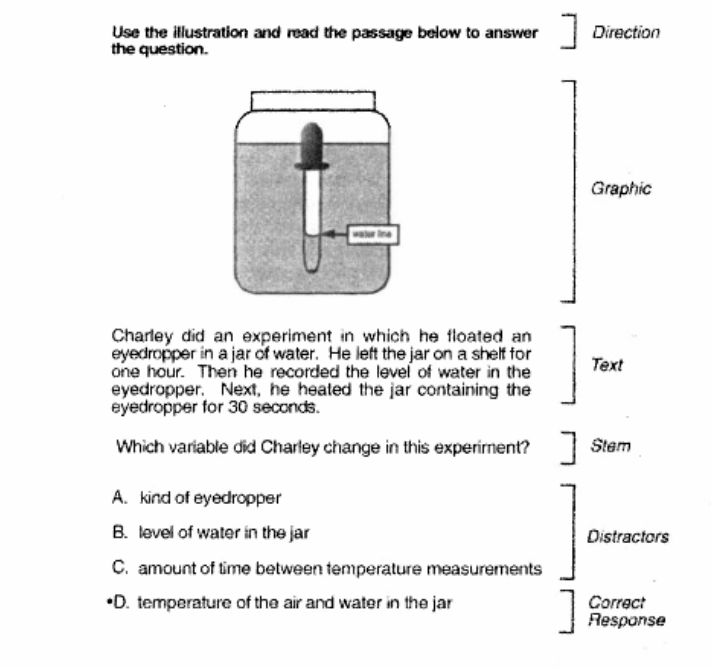

Figure 7. Example of Selected-response Item and Test-item Nomenclature
(Osterlind, 1997, p. 34)

Constructive-response style items only provide the examinee the problem. The examinee is required to respond by providing the perceived correct response. Each format has its advantages and disadvantages. For example, it is typically easier and less resource intensive to score selected-response items. Items can further be refined into specific formats such as multiple choice, true/false, matching, sentence completion, short answer, essay, and so forth.

There are two types of test-item writers: professional and casual (Osterlind, 1997). As casual writers, we used collected checklists to guide us during the item-writing step. Many of the references we reviewed contained useful item-writing tips. These tips not only focused on the specifics of writing one test item but also included more expansive topics, such as how to order items within a test, and ethical or legal concerns for using copyrighted test items.

Faulty test items are typically ambiguous and trivial (Nunnally & Bernstein, 1978). Item writers should establish a random system to position the correct answer among alternatives in order to mitigate biases within the test (Wood, 1960). Five rules in writing good multiple-choice items include the following:

1. The writing should be simple,
2. All distracters should be capable of distracting subjects,
3. Only one option should be correct,
4. The answer to one question should not give clues to the answer to another, and
5. Testing the trivial should be avoided because it is easy to test. (Kline, 1986)

Kline (1986) further suggests that one technique for determining which item format best suits a particular subject is to write them all. Through this process, a test writer can eliminate those formats that do not suit a particular subject and then select from the remaining options the format that best achieves the intended purpose of the item. A more exhaustive list of 31 general item-writing guidelines can be found in *Developing and Validating Multiple-Choice Test Items*. Some of these guidelines include the following: avoid using "all of the above," avoid trick items, make the stem as brief as possible, place the main idea of the item in the stem and not in the choices, and so forth (Haladyna, 2004). Chapter IV, Methodology, clearly describes which rules we used to guide us through item writing.

D. Summary

This chapter reviews related studies, reports, articles and other literature on the topics of contingency contracting and test construction and evaluation. Within the realm of contingency contracting, the research team focused on the history and evolution of tasks related to training CCOs for deployment to a contingency environment. The review examined literature pertaining to contingency contracting on all the major conflicts the United States military has taken part in, training

methods and tasks for contingency contractors, and the problems plaguing contingency contracting, as highlighted by the Gansler report. Our review of contingency contracting culminated with a discussion of the establishment of the ECC and the development of the *SMCT*. Within our discussion of test construction and evaluation, the research team focused on overarching principles of assessment as a subset of the adult-learning model, core test principles, test construction, test blueprints, Bloom's *Taxonomy*, and item writing, as it relates to test construction. The *SMCT*, developed to provide CCOs and their leaders with a standard by which to train, lacks a standardized test for measuring performance against that standard. The research team developed a test by combining these two distinct disciplines using knowledge gained during this literature review.

In conducting this literature review, we realize that there are certain limitations on our ability to develop a comprehensive assessment test for CCOs. The most obvious is that we are not professional test developers. The field of test construction and evaluation is extremely broad and quite extensive. Professional test developers could rightfully take years to develop an assessment test for CCOs, while this research has to be completed within certain time constraints to satisfy academic requirements. Given our limitations in both experience as test developers and in the time constraints of the academic schedule, we developed a modified test-development plan that applies the principles of test construction and evaluation. Chapter IV, Methodology, covers in detail the actual steps we took in developing the PAT and how it varies from the theoretical test-construction principles discussed in this chapter.

The next chapter focuses on frameworks of the contingency contracting environment. The research team focuses primarily on the historical context and establishment of the US Army's Expeditionary Contracting Command (ECC). The chapter further discusses the current MOS 51C development and training model and how the *Soldier's Manual of Common Tasks* relates to this model.

THIS PAGE INTENTIONALLY LEFT BLANK

III. Contingency Contracting Framework—The ECC and the *SMCT*

A. Introduction

The purpose of this chapter is to provide an overview of the ECC as an organization and to describe in detail the content of the *SMCT*. In this chapter, we discuss the context under which the ECC was established and describe the ECC organizational structure and training methodology. We also describe how the *SMCT* fits into the ECC's training strategy and break down the tasks in the document by their subcomponent parts.

B. Establishment of the ECC

The US Army's Expeditionary Contracting Command (ECC) was established in January 2008 in direct response to the Gansler Commission's recommendations to prepare, train and provide skilled contracting personnel in support of US Army contingency operations (DoA, 2009a). Among the Gansler Commission's four overarching recommendations, the first two addressed the need for changes in institutional and organizational structure to fix many of the Army's failures identified in the report. The first one recommends an increase in personnel, and the second recommends the establishment of a parent organization for those personnel. Specifically, recommendation number two (to restructure organization and restore responsibility to facilitate contracting and contract management in expeditionary and CONUS operations) lists several sub-recommendations. Among these are the recommendation to establish the Army Contracting Command (ACC) and the Expeditionary Contracting Command (ECC) as a subordinate element of the ACC (Gansler, 2007). Figure 8 depicts the ACC's and ECC's organizational structure.

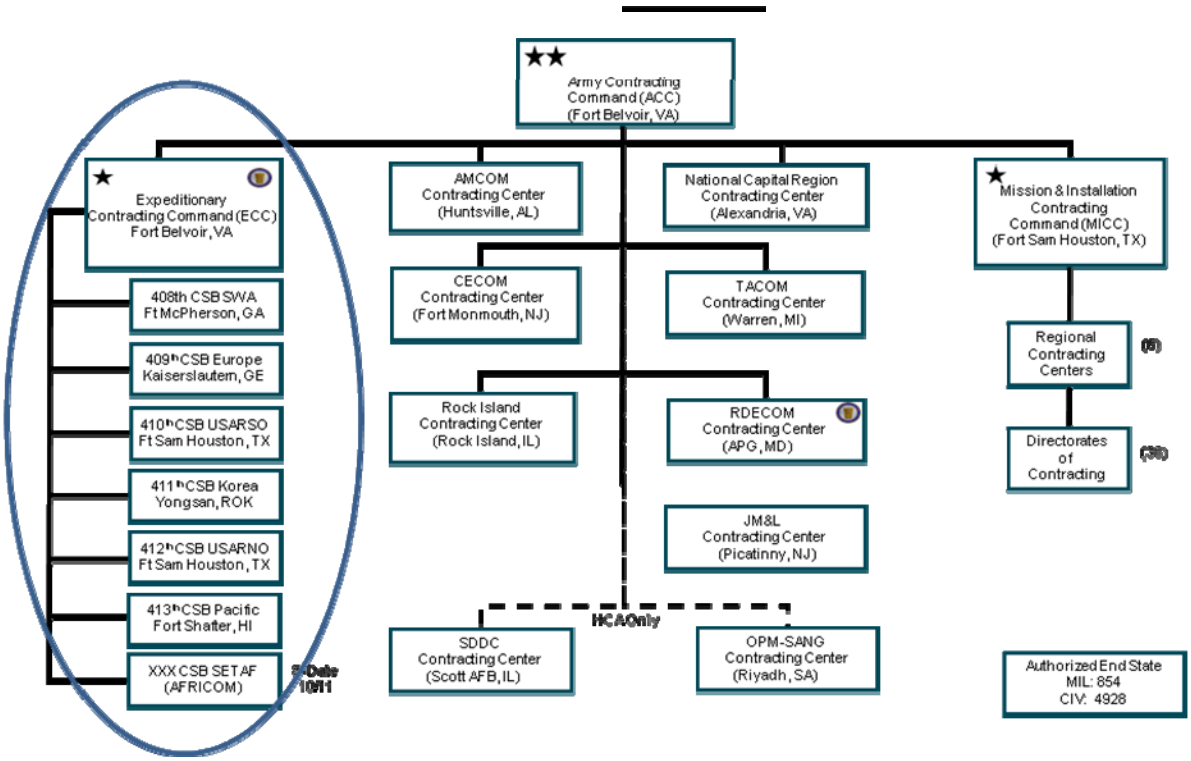

Figure 8. ACC and ECC Organizational Structure
(ECC, 2009, October 14)

Recommendation number one—increase the stature, quantity, and career development of the Army's contracting personnel, both military and civilian (especially for expeditionary operations)—recommends the authorization for general-officer billets to lead those organizations, the establishment of MOS 51C, and an increase in the Army's contracting workforce by 400 uniformed personnel and 1,000 civilian personnel (Gansler, 2007). It is these increases in uniformed personnel that will eventually fill the ranks of this new organization. While the Gansler Commission provided the recommendations for these new changes, *General Order (GO) No. 2009-20*, published July 8, 2009, officially established the ACC and ECC, effective January 30, 2008 (DoA, 2009, July 8).

C. ECC Organizational Structure

The ECC is comprised of a command headquarters and six contingency support brigades (CSBs). These CSBs are aligned with each Army geographical

theater. Each CSB is comprised of one or more contingency contracting battalions (CCBn), which, in turn, generally contain two or more contingency contracting teams of four MOS 51C personnel. The ECC headquarters provides the command and control of the Army's expeditionary-contracting assets. It is responsible for training, equipping, and providing trained contracting capability to support any contingency (ECC, 2009, October 14). It is under this charter that the ECC has developed the *SMCT*, with the intent of establishing a measurable standard for CCOs to train against in preparation for deployment. The lack of an assessment test to measure against that standard necessitates the development of the PAT and is the main driver for this research project.

D. Training Methodology

In developing a training methodology for CCOs in this new organization, the ECC acknowledges the multitude of requirements of a newly assigned CCO. Figure 9 depicts the ECC's CCO Development Model, which shows the multitude of requirements CCOs face to become proficient. This model shows the *SMCT* as one of the many educational and professional-development requirements of a CCO. At the core of a CCO's training is his warrior-task training. CCOs must remain proficient in the warfighting tasks of shooting, moving, and communicating in order to survive and win on the battlefield. Additionally, a CCO must take part in mandatory military training, such as training exercises at the training centers. As an acquisition professional, the CCO must meet civilian educational requirements as well as DAU certification requirements to remain proficient and current in the acquisition workforce. The 36 tasks of the *SMCT* serve to train the CCO in practical application of his craft so that he may be able to perform his mission while deployed. Finally, the contracting tasks the CCO performs while deployed round out the multitude of requirements a CCO must accomplish to be proficient. The proficiency-assessment test developed in this research will serve as a complement to the *SMCT* in this model, providing feedback to the CCO and his leaders on his ability to accomplish the tasks.

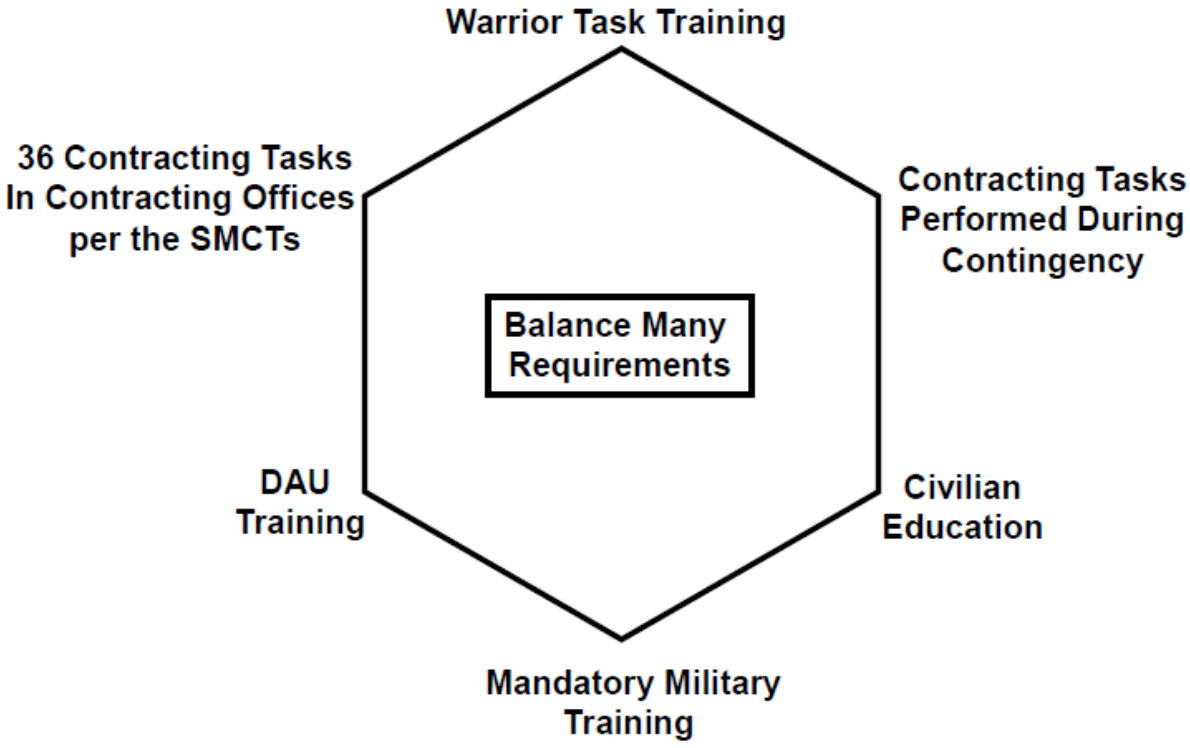

Figure 9. CCO Development Model
(ECC, 2009, September 22)

CCOs assigned to the ECC may come from a multitude of acquisition or operational Army experiences. They all, however, must meet the minimum education and training requirements prior to being assigned to the ECC as a CCO and must continue to train in preparation for deployment. The increased contingency contracting requirements and the growing number of CCOs within the ECC, a relatively new organization, means there are shortages of CCOs deployed in support of contingency operations. This assures that almost every newly assigned CCO arriving at a subordinate unit within the ECC will have an opportunity to deploy. Figure 10, from the ECC's briefing on phased development, depicts the typical timeline that CCOs currently experience from arrival to their unit through their first deployment and beyond. After being assessed into the Army Acquisition Corps (AAC) as a 51C and CCO receiving their preliminary functional training, they are awarded their Defense Acquisition Workforce Improvement Act (DAWIA) Contracting

Level I. Upon arrival to a team, the CCO continues to train for deployment, under the direction of a team leader or battalion commander, on the various requirements listed in Figure 9. It is during this time that a CCO may first take the PAT so that he or his leaders can assess his proficiency in the 36 tasks. From here, the team leader or battalion commander can work with the CCO to develop a specialized training program to improve his proficiency. After several months of training, the CCO may take the PAT again to assess proficiency once more.

These follow-on PATs may be used to gauge the CCO's progress and the effectiveness of a commander's training program. After a minimum of one year of training at the assigned duty station, the CCO may deploy in support of a contingency operation. One of the recommendations of the Gansler Commission that was adopted by the Army was to not send an untrained CCO into theater (Gansler, 2007). This standard timeframe of allowing a CCO to train for up to one year prior to deployment was adapted by the Army and the ECC and is depicted in Figure 10.

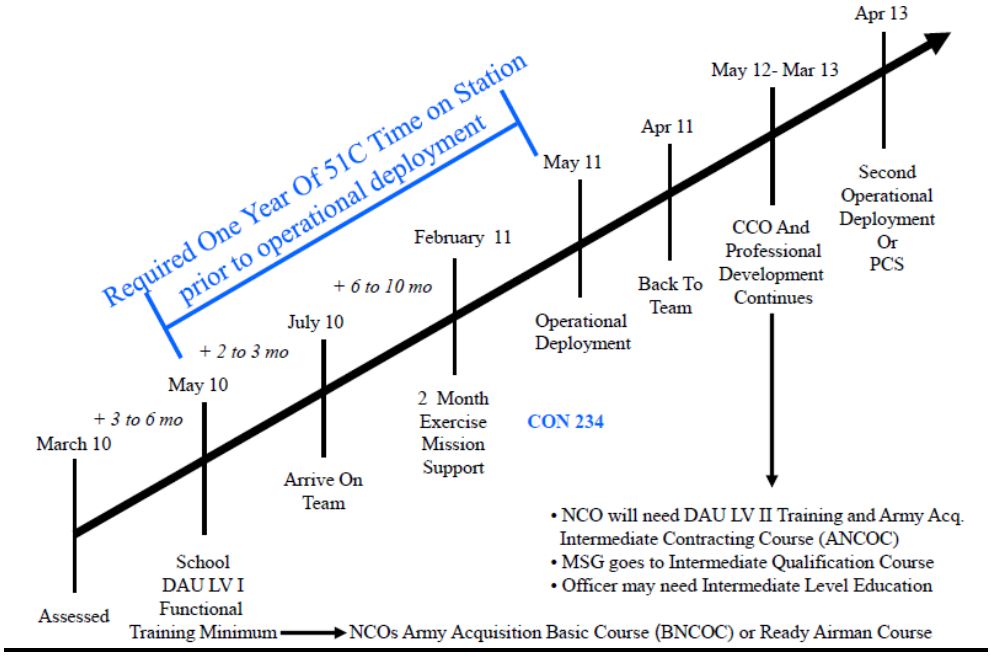

Figure 10. CCO Development Timeline
(ECC, 2009, September 22)

E. Contract Management Overview

The contract-management process from the buyer's perspective can be broken up into six steps. Garrett (2007) identifies these phases as (1) Procurement Planning, (2) Solicitation Planning, (3) Solicitation, (4) Source Selection, (5) Contract Administration, and (6) Contract Closeout or Termination. Rendon and Snider (2008) describe each of the six steps in the contract-management process as follows: Procurement Planning involves identifying what requirement can be met by procuring products or services from outside the organization. This phase involves deciding whether to procure, what and how much to procure, and when to procure it. Solicitation Planning involves the preparation of the documents needed to support the solicitation. Solicitation is the process of actually obtaining the bids and proposals from the prospective sellers. Source Selection is the process of receiving and evaluating the bids and proposals from prospective offerors and determining which offeror to select. Contract Administration is the process of ensuring that all of the parties involved in the contract meet their respective contractual obligations. Contract Closeout, or Termination, signifies the end of the contractual obligation between buyer and seller. It also involves ensuring that all administrative obligations stemming from the contract are complete (ibid).

These phases logically follow the lifecycle of a contract from start to finish. The *SMCT* is organized in a similar fashion. While not specifically aligned with the six phases of the contract-management process as identified by Garrett, the subject-area codes in the *SMCT* follow the natural progression of the lifecycle of a contract. Subject-area code 1 is contracting customer support tasks; subject-area code 2 is contracting pre-award tasks; subject-area code 3 is contracting post-award tasks; and subject-area code 4 is other contracting-officer tasks.

F. SMCT

The *Soldier's Manual of Common Tasks* identifies training requirements for soldiers, supervisors, trainers, and commanders in career-management field 51C.

Commanders use it to plan, conduct, and evaluate individual training (DoA, 2009, September 22). The Army training strategy relies on soldiers, noncommissioned officers, and officers to be trained and ready to fight our nation's wars. This dictum demands that soldiers and their commanders continuously plan and conduct realistic training. The *SMCT* provides the framework of that training for CCOs. The 36 training tasks that comprise the body of knowledge for a CCO are broken down into four subject-area codes. The four subject codes are as follows:

1. Contracting Customer Support Tasks
2. Contracting Pre-award Tasks
3. Contracting Post-award Tasks
4. Other Contracting Officer Tasks (DoA, 2009, September 22)

Each subject code, in turn, has corresponding tasks. Figure 11 depicts the 36 *SMCT* tasks. Subject codes are not in any particular order of difficulty or skill. All CCOs, regardless of rank, should be proficient in all tasks, regardless of subject code.

Subject Area	Task Number	Task
1	1-1	Identify Supported Units
1	1-2	Train Supported Units (Regarding Contracting Proceedures)
1	1-3	Advise Supported Units (Regarding Contracting Matters)
1	1-4	Prepare Contracting Support Integration Plans
2	2-1	Review Purchase Requests and Supporting Documents
2	2-2	Conduct Market Research
2	2-3	Conduct Acquisition Planning
2	2-4	Document Other Than Full and Open Competition
2	2-5	Train, Designate, Monitor And Terminate Contracting Officer Representatives (CORs)
2	2-6	Train, Designate Monitor and Terminate Ordering Officers (OO)
2	2-7	Synopsize Proposed Contract Actions
2	2-8	Solicit Competition
2	2-9	Receive Solicitation Responses
2	2-10	Evaluate Offers
2	2-11	Prepare Contract Awards
3	3-1	Conduct Post Award Orientations
3	3-2	Notify Unsuccessful Offerors- Award Synopsis
3	3-3	Issue Task Orders/Delivery Orders or BPA Calls
3	3-4	Exercise Options
3	3-5	Monitor Contract Performance
3	3-6	Process Documents For Payment
3	3-7	Modify Contracts
3	3-8	Terminate Contracts
3	3-9	Conduct Contract Closeout
3	3-10	Process Protests
3	3-11	Process Claims
3	3-12	Process Freedom Of Information Act Requests
3	3-13	Process Unauthorized Commitment s
4	4-1	Use Standard Form 44s (SF 44)
4	4-2	Train, Designate, Monitor And Terminate a Field Ordering Officer (FOO)
4	4-3	Issue Letter Contracts
4	4-4	Conduct Vendor Education
4	4-5	Employ The Government Purchase Card (GPC) As Payment Method and Procurement Tool
4	4-6	Manage Bulk Funds
4	4-7	Prepare For Deployment
4	4-8	Maintain PIIN Logs

Figure 11. 36 MOS 51 Common Tasks (*SMCT*)
(ECC, 2009, September 22)

Each of the 36 tasks is broken down into conditions, standards, and performance steps. The conditions of the task identify "any equipment, tools, references, job aids, and supporting personnel the Soldier needs to use to perform the task in wartime. It also identifies any environmental conditions that can alter task performance such as visibility, temperature or wind" (DoA, 2009, September 22). The standards are normally described in terms of accuracy, completeness, and speed and serve to describe how well and to what level the task must be performed during wartime. The performance steps comprise the training and evaluation section. These steps identify specific actions that a Soldier must take to successfully complete the task. In terms of developing the PAT, the conditions will help develop the scenarios, and the performance steps will help develop the answers to the test.

G. Summary

This chapter describes in detail the Expeditionary Contracting Command and the *Soldier's Manual of Common Tasks*. The chapter also describes the conditions under which the ECC was established, its organizational structure, and its purpose. Moreover, it breaks down the subordinate units within the ECC, from Headquarters to individual CCOs. Next, the chapter describes in detail the multitude of training requirements for CCOs within the framework of the ECC's training methodology. Finally, it breaks down the individual subcomponents of the *SMCT*.

The ECC was established in short order and has put into place many systems to improve the numerous shortfalls identified in the Gansler Commission's report and other governmental oversight reports. It is striving to train and develop 400 newly assigned uniformed CCOs and 1,000 civilian contracting personnel. In doing so, it must also maintain command and control of current CCOs. It has developed a model training plan for CCOs and provided the training doctrine in the form of the *Soldier's Manual of Common Tasks* to support their goals. However, the *SMCT* remains incomplete without a formalized proficiency-assessment test to measure a CCO's performance against the *SMCT* standards. The purpose of this research is to develop such a test. Chapter IV, PAT Development, will cover in detail the process the research team used to develop the PAT. Chapter IV also describes in detail how the proficiency-assessment test was created. It describes the research team's use of the test-construction theoretical framework and accounts for any deviations made in that framework due to time or academic constraints.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. PAT Development

A. Introduction

This chapter discusses the steps and methodology the research team took in developing the PAT. In this chapter we explain how we applied the theoretical academic principles of test construction we learned during our literature review. We also explain how we applied them given our limitations, both as students (non-professional test writers) and in terms of time constraints, given our academic schedule.

B. Test-Construction Plan

The development of the PAT was planned with the test-user and test-taker in mind. The research team had to build the PAT to meet the needs of the Expeditionary Contracting Command and the CCOs who would eventually take the test. We envisioned the PAT being taken in a digitized format, as this would be the most efficient manner in both administering the test and in taking it. Moreover, a digitized version of the test would be less susceptible to compromise by would-be test takers and would lend itself better to modifications. While placing the PAT in its final digitized version was not part of the scope of this project, the questions and answers written by the research team had to be developed in a manner that would make a transfer to digitized form convenient.

In developing the PAT, the research team could not follow the steps for test construction identified in the literature review as described by either Downing and Haladyna (2006) or Allen and Yen (2001). We knew early on that our academic calendar and limited knowledge in test construction would not allow us to develop the test in this manner. Instead, we prioritized the major steps that were common between the two lists and focused on test blueprinting and item writing.

C. Test Blueprint

The research team first developed a test blueprint for each of the tasks. The test blueprint acted as a road map for test construction by laying out which subject areas we wanted to test and at what cognitive domains the subject area should be tested. This test blueprint broke down each of the tasks into subcomponents called items. Each item is a specific subset of knowledge of that particular task. The research team developed a spreadsheet that listed each of the items within a specific task with several questions corresponding to each item. We then wrote questions that tested knowledge of that item. As we wrote questions for each task, we annotated on the spreadsheet which cognitive-domain level the questions tested. In this way, we were able to determine when we had adequate numbers of questions for each item that tested within each cognitive-domain category.

D. Item Writing

The research team took each task and broke it down to its subcomponents of task, conditions, and performance steps. The tasks in the *SMCT* represent the 36 testable tasks that we used to measure proficiency. Having the task, conditions and performance test essentially gave us the questions and answers. We used these elements of the tasks of the *SMCT* to construct the test questions.

The research team used the knowledge gained during the literature review and planned the PAT as a criterion-referenced test. Criterion-referenced tests attempt to determine if an individual has mastered a subject area in a specific learning objective (Marshall & Hales, 1972). In the case of the PAT, this test would attempt to determine if CCOs had mastered the particular task within the *SMCT*.

E. Validity and Reliability

Test validity and reliability were two essential test characteristics we identified during our literature review and had to pay attention to during item writing. The research team, as much as possible, wanted to ensure the PAT was written with

these two attributes in mind. We accepted that we would not be able to measure either validity or reliability in our test, as doing so would involve issuing the test to sample populations and measuring consistency in responses (Allen & Yen, 2001; APA, 1974). The academic and time constraints would not allow us to follow through with the test development in this manner. However, we did take into account factors to maximize both validity and reliability in our test.

To ensure reliability, the research team incorporated guidelines for item writing as presented by Kline (1986). These guidelines included (1) reducing the insight into the items that subjects may have, (2) writing in clear, unambiguous terms, (3) referring to specific instead of general behavior, (4) ensuring each item asked only one question or made one statement, and (5) avoiding as much as possible terms of frequency (Kline, 1986).

Additionally, we looked at test length to increase its reliability. Generally, the longer the test, the more reliable it is (Nunnally & Bernstein, 1978). Based on this premise, the research team attempted, whenever possible, to write at least 20 items for each task. The length of the task, conditions and performance measures for each of the tasks varied and as a result, so did the number of items for each task. Some tasks required well over thirty questions, while some were so short that only 10 could be developed.

In an effort to prevent compromise of the test by would-be test takers, the research team doubled the number of questions for each task from an average of 20 questions per task to an average of forty questions per task. This doubling of items would serve to increase the database of questions for a digitized version of the test, thus allowing for multiple versions of the test to be administered. In addition, the doubling of items would result in greater validity.

The research team also took into account efforts in the development of the PAT to ensure content validity of the test. According to Nunnally (1972), validity is how well a test meets its designed function. The PAT was designed to measure

proficiency in the 36 tasks listed in the *SMCT*. One of the ways that the research team ensured the test measured the content of those tasks was by deconstructing the task, conditions, and performance measures in the *SMCT* and rewriting them as questions. For example, for Task 1-1, Identify Supported Units, one of the performance steps is to recognize key personnel and support elements. The *SMCT* lists several key positions the CCO may come in contact with. Under the position of Finance Officer, it states "Key element responsible for banking and currency support, disbursing functions, and electronic funds transfers." In order to ensure that the question measured the content of the performance step, the research team would rephrase the verbiage in the *SMCT* in the form of a question, such as "Who is responsible for banking and currency support, disbursing functions, and electronic funds transfers?" This question would be followed by several possible answers, one of which would be the correct answer (Finance Officer). The other (incorrect) answers would come from the list of the other key personnel described in the *SMCT*.

Once the questions for each subject area were completed, they were e-mailed, in a Word document, to our sponsor at the Expeditionary Contracting Command. Our sponsor would then mail these questions out to senior civilian and military CCOs for vetting. This vetting process by senior leaders and experts in the field of contingency contracting was another way to ensure content validity (Nunnally & Bernstein, 1978).

F. Cognitive Domains

The research team took into account the application and use of the test when determining the cognitive domains that the test would measure. The ECC needed the PAT to administer to thousands of CCOs throughout the Army. This necessitated a test that could be administered to numerous individuals, at different times and locations, by numerous test administrators. Because of this, the final version of the test would need to be computer-based. For this reason, most of the questions and answers were written in a multiple-choice format. As such, most of

the questions tested knowledge in the memory, understanding, and application categories of Bloom's cognitive domains only to a limited extent.

As previously stated, nearly all the questions were written as what are commonly referred to as multiple-choice questions. These multiple-choice questions, also known as selected-response items, occur when the examinee is given both the problem and the correct solution and then must choose the correct solution from among the incorrect solutions. We chose selected-response items over constructive-response questions for the PAT since selected-response were less resource intensive and more conducive to a digitized format. The research team expanded the format of selected-response questions to include true/false, matching and sentence completion.

Wood (1960) suggests item writers should establish a random system to position the correct response when developing selective-response items in order to avoid bias within the test. The reasoning for this is that test developers will inadvertently choose a particular response position over others, and this may induce bias in the test. In other words, a test developer could inadvertently end up with the response letter A, for example, as the answer to most of the multiple choice questions. In order to mitigate this, every question the research team wrote had the first response, or the answer letter A, as the correct answer. In this way, the ECC, or future test developers who transfer the test to a digitized usable form, could randomly shuffle the available choices and the correct response. Additionally, this method made it easier for the ECC to establish the test's validity since it eliminated the need for an answer key.

G. Summary

Over the course of four months, the research team wrote approximately 40 test questions for each of the 36 tasks in the *SMCT*. The tasks varied in length, so some of the tasks had as few as ten questions and some had as many as 60. In total, the research team wrote over 1,100 questions for the *SMCT*, spanning over

300 pages of text. Many of the questions were developed to test redundant items. In this way, these questions could be used in different versions of the test. The question-and-answer sheets were submitted to our sponsor at the ECC in Word format. At the time of this writing, the ECC and its senior level leaders, made up of experienced CCOs, had received all questions for the 36 tasks the team developed. The next chapter is the conclusion of this research project. It lists recommendations for administration of the test and suggests areas for further research.

V. Summary, Conclusion, and Areas for Further Research

A. Summary

US Army contingency contracting officers (CCOs) have played a critical role in nearly every overseas military operation by providing supplies and services to the warfighter in an efficient, timely, and ethical manner. Despite this critical role, the Army has not integrated its CCOs or the procurement process in a holistic approach to its expeditionary, warfighting mindset. Shortfalls in the number of US Army CCO personnel and the lack of a standardized training process have negatively affected the Army's expeditionary procurement capabilities.

The US Army's Expeditionary Contracting Command (ECC) was established in January 2008 in direct response to the Gansler Commission's recommendations to prepare, train, and provide skilled contracting personnel in support of US Army contingency operations. This new command, and other changes resulting from the Gansler Commission's recommendations, produced a planned net increase of over 400 uniformed and 800 civilian contracting officer positions. The ECC developed a standardized set of 36 tasks to properly train CCOs prior to deployment. These 36 tasks, published in the ECC's *Soldier's Manual of Common Tasks* (*SMCT*) *MOS 51C Acquisition, Logistics, and Technology*, represent the body of knowledge that a 51C CCO must have to be successful during contingency operations.

The establishment and standardization of training tasks by the ECC for CCOs in the *MOS 51C SMCT*, in accordance with Army training doctrine, has helped subordinate units and individual CCOs within the ECC to focus their training efforts prior to deployment. This body of knowledge is a significant step in standardizing the pre-deployment training for CCOs and preparing them for their missions once deployed. To supplement this training, an appropriate performance-assessment tool

is needed to measure performance of these 36 tasks. Currently, the ECC lacks a standardized method of measuring individual skill and task proficiency in its CCOs.

The written proficiency-assessment test questions and answers developed in this research will allow leaders in the ECC to measure a CCO's knowledge, skills, and capabilities. A PAT will enable leaders to measure individual task proficiency against established standards, determine each CCO's preparedness to conduct duties during deployment, make appropriate CCO assignments, and develop individualized training programs for CCOs.

This research developed the questions for a written proficiency test based on the 36 tasks listed in the *SMCT*. The research team developed the scenarios and questions to assess proficiency in accordance with conditions, standards, and performance steps for each of the 36 tasks in the *SMCT*. We structured questions to assess Bloom's cognitive domains of remembering, understanding, and, to a limited extent, applying the tasks. The research team vetted each of the scenarios and accompanying questions through experienced CCO focus groups within the ECC. Upon completion of the test, the research team provided the Expeditionary Contracting Command with a written Contracting Officer Proficiency-assessment Test, encompassing over 1,100 questions covering each of the 36 tasks listed in the *SMCT*.

B. Conclusion

The results of this research project—over 300 pages containing over 1,100 multiple-choice questions and their respective answers—were developed over the course of a year. These documents represent the first step in developing a proficiency-assessment test for the Expeditionary Contracting Command's growing ranks of CCOs.

At the beginning of this research project, we posed the following research question: What is the most effective and efficient method of measuring Individual

CCO task proficiency in the 36 tasks listed in the *SMCT*? We found that a multiple-choice (selective-response) test administered in digitized format and directly measuring the performance measures in the *SMCT* would be the answer to this question. In developing the PAT, we never intended to convert the final PAT into a digitized version, as this was outside the scope of our project, but we did write the test questions and answers that would go into such a test, and we formatted those questions and answers in such a way that they could easily be converted into a digitized test by follow-on researchers.

Secondary research questions we asked and attempted to answer were as follows:

- How can a proficiency-assessment test be developed? In answering this question, we looked to core test principles, test-construction methods, test blueprints, and item writing covered in our literature review. Instead of providing the answer to this question, we used the knowledge gained in answering the question to develop the PAT questions.
- What type(s) of testing is best suited to evaluate the cognitive domains of remembering, understanding, and, to a limited extent, application of knowledge? As in the previous secondary research question, the answer to this question helped the research team formulate the best type of test, given the requirements of the ECC. Given that any final version of the PAT would have to be administered at various locations throughout the world to numerous CCOs at varying times, selective-response questions were deemed best.
- What type(s) of testing is most efficient—in terms of requiring the least amount of resources, such as overhead and setup—for the tester and test taker? This last question identifies the need for the PAT to be administered, taken, and graded in a digitized format.

We discovered the answers to the secondary research questions by conducting our literature review on test construction and in developing the test. We asked and attempted to answer these questions, not for the answers in and of themselves, but to provide clues as to how to make the most effective proficiency-assessment test for the ECC. In this sense, the answers to these research

questions did not, by themselves, satisfy the requirements of the research project. Instead, answering these research questions gave us the know-how to write the PAT. The result of the knowledge we gained in answering these questions is the over 1,100 questions written by the research team and presented to the ECC for inclusion in the PAT.

At the conclusion of this research project, all question and answers were submitted to the ECC for review. This transfer of questions and answers signifies transfer of ownership of this body of knowledge, created during the conduct of this research, from the research team to the Expeditionary Contracting Command. The ECC can now use these questions to complete the conversion of the PAT from its current raw form to a usable test.

C. Areas for Further Research

There are several areas the research team recommends for follow-on research. Our team's research was able to develop the questions and answers for a PAT for the *SMCT*. However, the test as presented in this research project is not in a usable form. Most of our recommendations for further research are tied to the continued development of the PAT as a usable test for the ECC. Specifically, the research team makes the following recommendations: (1) Convert the test from its current, written form to a digitized version, (2) Measure the test for validity and reliability, (3) Increase the number of questions in the question-and-answer database, (4) Increase the number of scenario- and performance-based questions that measure the application-category cognitive domain, and (5) Continually validate the 36 tasks listed in the *SMCT* as current, given emerging trends in contingency contracting.

The test, in its present form, cannot be administered. The product of this research project resulted in over 1,100 questions with multiple-choice answers, the correct answer for each being the first one, or A. A follow-on group of researchers could take the questions and answers this research has developed and convert

them into a digitized version that could be administered, taken, and graded via computer. This computerized test could serve as the prototype for the ECC—a prototype from which the test could be measured for reliability and validity if the ECC desired.

The test should be measured for validity and reliability. While we took steps to mitigate the test development errors that affect validity and reliability, we could not fully validate the test. A follow-on research team could issue the test in a digitized form to a sample pool of CCOs and measure it to determine if, in fact, the test is an accurate indicator of the knowledge it is intended to measure (validity) and that it continuously does so (reliability).

The test should include additional questions in multiple combinations to create various versions of the test. When we designed the test, we attempted to write at least 20 questions per task. In an effort to limit test memorization and compromise, we increased the number of test questions to 40 per task for each of the 36 tasks. These questions may have to be replaced during the vetting process or when the test is measured for validity and reliability. These omitted questions should be replaced, and new questions should be added to increase the number of questions in the question database.

Additionally, questions that measure more demanding cognitive-domain categories, such as application of knowledge, should be developed for the test. This test, while computer administered, could still include performance-based questions where test takers would have to read a scenario and fill out proper forms related to contingency contracting. This research effort would not only increase the number of questions but also more accurately measure a CCO's abilities to perform his/her mission by testing at a more demanding cognitive level.

The tasks contained in the *SMCT* should be validated against emerging trends in contingency contracting. This PAT was developed based on the 36 tasks in the *SMCT*. Our literature review showed that tasks in contingency contracting

training have changed as the nature of warfare has evolved. Based on these changes, the research team assumes that the 36 tasks in the *SMCT* are also susceptible to obsolescence. A periodic review of the relevance of the 36 tasks contained in the *SMCT* would assist test administrators and developers of the PAT to refine both the *SMCT* and the content of the PAT.

Finally, the research team acknowledged early on that we would not be able to fully develop the PAT into its final, usable form as a computer-administered test. To this end, we have sought to establish a long-term partnership between the Naval Postgraduate School (NPS) and the Expeditionary Contracting Command to continue to develop and refine the proficiency-assessment test for CCOs. The ECC should continue to reach out to NPS to facilitate the evolution of the test. Similarly, NPS faculty and students interested in the field of study of contingency contracting should look to ECC for real-world problem sets with which to assist.

The proficiency-assessment test as presented in this research is a giant step in standardizing an individual proficiency-assessment tool. While it is not immediately usable and implementable by the ECC in its current form, it is our hope that the products resulting from this research will serve the ECC as a solid base in furthering this effort. Once implemented, the proficiency-assessment test submitted as part of this research will allow leaders in the ECC to measure a CCO's knowledge, skills, and capabilities by measuring individual task proficiency against the established standards contained in the *SMCT*. The PAT will finally allow leaders within the ECC to effectively and efficiently determine each CCO's preparedness to conduct duties during deployment, make appropriate CCO assignments, and develop individualized training programs for CCOs.

List of References

Allen, M.J., & Yen, W.M. (2001). *Introduction to measurement theory*. Belmont, CA: Waveland Press.

American Psychological Association (APA). (1974). *Standards for educational and psychological tests*. Washington, DC: Author.

Anastasi, A. (1982). *Psychological testing*. New York: Macmillan Publishing.

Anderson, L.W., Krathwohl, D.R., Airasian, P.W., Cruikshank, K.A., Mayer, R.E., & Pintrich, P.R. (2002). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's* Taxanomy of Educational Objectives. New York: Taylor & Francis.

Bloom, B.S. (1956). *Taxonomy of educational objectives*. New York: David McKay.

Brennan, R.L. (2006). *Educational measurement*. Lenham, MD: Rowman & Littlefield Education.

Burger, A.B., Kehr, J.R., & Wobensmith, B.E. (2003). *Marine Corps contingency contracting MCI* (NPS-CM-04-002). Monterey, CA: Naval Postgraduate School.

Commission on Wartime Contracting (CWC). (2009, June). *At what cost? Contingency contracting in Iraq and Afghanistan*. Washington, DC: Author.

Crocker, L.M., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York: Holt, Rinehart, and Winston.

Defense Acquisition University (DAU). (2008). *Mission statement*. Retreived November 23, 2009, from http://www. dau.mil

Defense Procurement and Acquisition Policy (DPAP). (2008). *Contingency contracting: A joint handbook for the 21st century*. Maxwell, AL: Air Force Logistics Management Agency.

Department of the Army (DoA). (2002). *Training the force* (Field Manual (FM) 7-0). Washington, DC: Author.

Department of the Army (DoA). (2003). *Battle focused training* (Field Manual (FM) 7-1). Washington, DC: Author.

Department of the Army (DoA). (2009a). *A statement of the posture of the United States Army 2009*. Washington, DC: Author.

Department of the Army (DoA). (2009b). *Army regulation 350-1 Army training and leader development*. Washington, DC: Author.

Department of the Army (DoA). (2009, July 8). *Establishment of the United States Army contracting command as a major subordinate command of the United States Army material command* (General Order No. 2009-20). Washington, DC: Author.

Department of the Army (DoA). (2009, September 22). *Expeditionary contracting command soldier's manual of common tasks MOS 51C*. Fort Belvoir, VA: Author.

Downing, S.M., & Haladyna, T.M. (2006). *Handbook of test development*. Mahway, NY: Lawrence Erlbaum Associates.

Expeditionary Contracting Command (ECC). (2009, April 21). *Fundamentals brief: G-3 training*. Fort Belvoir: Author.

Expeditionary Contracting Command (ECC). (2009, September 22). *ACC phased MOS 51C development*. Fort Belvoir, VA: Author.

Expeditionary Contracting Command (ECC). (2009, October 14). *ECC brief for brigade combat team commanders*. Fort Belvoir, VA: Author.

Gansler, J.S., Berteau, D.J., Naddox, D.M., Oliver, D.R., Salomon, L.E., & Singley, G.T. (2007). *Urgent reform required: Army expeditionary contracting*. Report of the Commission on Army Acquisition and Program Management in Expeditionary Operations. Washington, DC: Author.

Garrett, G.A. (2007). *World class contracting* (4th ed.). Riverwoods, IL: CCH.

Government Accountability Office (GOA). (2007, July). *Federal acquisitions and contracting: Systemic challenges need attention*. Washington, DC: Author.

Government Accountability Office (GOA). (2008, March). *Defense contracting: Army case study delineates concerns with use of contractors as contract specialists*. Washington, DC: Author.

Government Accountability Office (GOA). (2008, October). *Contingency contracting: DoD, State, and USAID contracts and contractor personnel in Iraq and Afghanistan*. Washington, DC: Author.

Haladyna, T.M. (2004). *Developing and validating multiple-choice test items*. Mahway, NY: Lawrence Erlbaum Associates.

Izard, J.F. (1997). *Trial testing and item analysis in test construction*. Paris: International Institute for Educational Planning.

Killen, K.E., & Wilson, G.P. (1992). *An analysis of contracting actions by United States based Department of Defense organizations to support Operations Desert Shield and Desert Storm*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology.

Kirstein, J.A. (2003). *A study of the efficacy of unit contingency contracting training*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology.

Kline, P. (1986). *A handbook of test construction: Introduction to psychometric design*. New York: Methuen.

Knowles, M.S., Holton, E.F., & Swanson, R.A. (1998). *The adult learner*. Houston, TX: Gulf Publishing.

Kyllonen, P.C., & Shute, V.J. (1988). *Taxonomy of learning skills*. Brooks Air Force Base, TX: Air Force Human Resources Laboratory.

Lasch, P.S. (2002). *Analysis of Air Force contingency contracting training needs*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology.

Luse, C., Madeline, C., Smith, L., & Starr, S. (2005). *An evaluation of contingency contracting: Past, present and future* Master's Thesis. Monterey, CA: Naval Postgraduate School.

Marshall, J.C., & Hales, L.W. (1972). *Essentials of testing*. London: Addison-Wesley Publishing.

Mason, R.L. (1988). *Contingency contracting during low-intensity conflicts*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology.

Nash, R.C., Jr. (1997). Training the contracting officer of the future. *Program Manager*, *26*(4), 3.

Nunnally, J.C. (1972). *Educational measurement and evaluation*. New York: McGraw-Hill.

Nunnally, J.C., & Bernstein, I. (1978). *Psychometric theory*. New York: McGraw-Hill.

Osterlind, S.J. (1997). *Constructing test items: Multiple choice, constructed-response, performance and other formats*. Norwell, MA: Kluwer.

Pagonis. W. (1992). *Moving mountains: Lessons in leadership and logistics from the Gulf War*. Boston: Harvard Business School Press.

Phillups, J. (1997). *Handbook of training evaluation and measurement methods*. Houston, TX: Gulf Publishing.

Piskurich, G.M., Beckschi, P., & Hall, B. (2000). *The ASTD handbook of training design and delivery*. New York: McGraw-Hill.

Rendon, R., & Snider, K. (2008). *Management of defense acquisition projects*. Palmdale, CA: Library of Flight.

Rossett, A. (1999). *First things fast: A handbook for performance analysis*. San Francisco: Jossey-Bass/Pfeiffer.

Tigges, J.B., & Snyder, T.J. (1993). *A study of Air Force theater-based contingency contracting training requirements for a power projection strategy*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology.

Wood, D.A. (1960). *Test construction development and interpretation of achievement tests*. Columbus, OH: Charles E. Merrill Books.

2003 - 2010 Sponsored Research Topics

Acquisition Management

- Acquiring Combat Capability via Public-Private Partnerships (PPPs)
- BCA: Contractor vs. Organic Growth
- Defense Industry Consolidation
- EU-US Defense Industrial Relationships
- Knowledge Value Added (KVA) + Real Options (RO) Applied to Shipyard Planning Processes
- Managing the Services Supply Chain
- MOSA Contracting Implications
- Portfolio Optimization via KVA + RO
- Private Military Sector
- Software Requirements for OA
- Spiral Development
- Strategy for Defense Acquisition Research
- The Software, Hardware Asset Reuse Enterprise (SHARE) repository

Contract Management

- Commodity Sourcing Strategies
- Contracting Government Procurement Functions
- Contractors in 21st-century Combat Zone
- Joint Contingency Contracting
- Model for Optimizing Contingency Contracting, Planning and Execution
- Navy Contract Writing Guide
- Past Performance in Source Selection
- Strategic Contingency Contracting
- Transforming DoD Contract Closeout
- USAF Energy Savings Performance Contracts
- USAF IT Commodity Council
- USMC Contingency Contracting

Financial Management

- Acquisitions via Leasing: MPS case
- Budget Scoring
- Budgeting for Capabilities-based Planning
- Capital Budgeting for the DoD
- Energy Saving Contracts/DoD Mobile Assets
- Financing DoD Budget via PPPs
- Lessons from Private Sector Capital Budgeting for DoD Acquisition Budgeting Reform
- PPPs and Government Financing
- ROI of Information Warfare Systems
- Special Termination Liability in MDAPs
- Strategic Sourcing
- Transaction Cost Economics (TCE) to Improve Cost Estimates

Human Resources

- Indefinite Reenlistment
- Individual Augmentation
- Learning Management Systems
- Moral Conduct Waivers and First-tem Attrition
- Retention
- The Navy's Selective Reenlistment Bonus (SRB) Management System
- Tuition Assistance

Logistics Management

- Analysis of LAV Depot Maintenance
- Army LOG MOD
- ASDS Product Support Analysis
- Cold-chain Logistics
- Contractors Supporting Military Operations
- Diffusion/Variability on Vendor Performance Evaluation
- Evolutionary Acquisition

- Lean Six Sigma to Reduce Costs and Improve Readiness
- Naval Aviation Maintenance and Process Improvement (2)
- Optimizing CIWS Lifecycle Support (LCS)
- Outsourcing the Pearl Harbor MK-48 Intermediate Maintenance Activity
- Pallet Management System
- PBL (4)
- Privatization-NOSL/NAWCI
- RFID (6)
- Risk Analysis for Performance-based Logistics
- R-TOC AEGIS Microwave Power Tubes
- Sense-and-Respond Logistics Network
- Strategic Sourcing

Program Management

- Building Collaborative Capacity
- Business Process Reengineering (BPR) for LCS Mission Module Acquisition
- Collaborative IT Tools Leveraging Competence
- Contractor vs. Organic Support
- Knowledge, Responsibilities and Decision Rights in MDAPs
- KVA Applied to AEGIS and SSDS
- Managing the Service Supply Chain
- Measuring Uncertainty in Earned Value
- Organizational Modeling and Simulation
- Public-Private Partnership
- Terminating Your Own Program
- Utilizing Collaborative and Three-dimensional Imaging Technology

A complete listing and electronic copies of published research are available on our website: www.acquisitionresearch.org

THIS PAGE INTENTIONALLY LEFT BLANK

ACQUISITION RESEARCH PROGRAM
GRADUATE SCHOOL OF BUSINESS & PUBLIC POLICY
NAVAL POSTGRADUATE SCHOOL
555 DYER ROAD, INGERSOLL HALL
MONTEREY, CALIFORNIA 93943

www.acquisitionresearch.org