AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

AIR FORCE AUDIT AGENCY WEAPON SYSTEM RESEARCH METHODOLOGY

MR. EARL J. SCOTT

85-2350

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This study represents an analysis of the research methodology used by AFAA/QLW to identify potential issues for audit application. The study evaluates research objectives and time constraints, the criteria for issues most important to weapon system audits, the functional areas most critical to weapon systems, and the specific issues where audits should focus. The study concludes that research objectives do not provide audit managers sufficient direction to effectively complete research within normal time constraints. Survey questionnaires are included. (Air Force Audit Agency)

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PREFACE

This study represents an analysis of the research methodology used by the Air Force Audit Agency Acquisition and Logistics Weapon System Associate Directorate (AFAA/QLW) to identify potential issues for audit application. QLW provides significant information to Air Force officials on the ways and means to improve weapon systems acquisition. The limited audit resources available to accomplish this task must be continually evaluated to ensure the most important weapon system issues are audited in the most efficient manner possible. This report can contribute to that evaluation process.

Many individuals contributed to the analysis that resulted in this report. They include Mr. Jackie Crawford, his QLW staff, and audit managers. Considerable thanks are also due to Major William Furr of the Air Command and Staff College for his thoughtful comments and suggestions during the project.

ABOUT THE AUTHOR

The analysis that resulted in this report was performed by Earl J. Scott. Earl received a Bachelor of Science degree in Accounting from Wright State University and attended the Master of Business Administrative Program at Baldwin-Wallace College. He has been a DOD auditor since 1975.

Initially, Earl was a financial and accounting system auditor at the Navy Finance Center in Cleveland, Ohio. During four years at the center, he managed audits of the Navy accounts receivable system, fleet disbursing and voucher program, and the automated pay systems for both active and retired members. The audit work included evaluation of internal controls and economy and efficiency reviews for all centralized Navy financial and accounting systems.

Earl transferred to the Aeronautical Systems Division office of the Air Force Audit Agency (AFAA) in December, 1978. As a staff auditor he performed economy and efficiency, and program results audits of Air Force contract negotiation processes, electronic warfare capabilities, laboratory management practices, and the F-16 weapon system. In 1981, Earl transferred to the newly formed Associate Directorate for Weapon System Audits (AFAA/QLW). Since that time his responsibilities have included managing program results audits of major Air Force weapon systems such as the MX, TR-1, and the Ground Launched Cruise Missile (GLCM). Earl was awarded the first annual AFAA Audit Manager of the Year Award in 1983.

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AUTHOR(S) MR. EARL J. SCOTT

TITLE AIR FORCE AUDIT AGENCY WEAPON SYSTEM RESEARCH METHODOLOGY

Audit research provides the information used to determine the necessity and framework for audit effort within weapon systems. Whether weapon system audits successfully provide meaningful information to the Secretary depends on the Air Force Audit Agency's capability to quickly assess potential problems during the research phase. While Agency weapon system evaluations have led to significant improvements in Air Force capabilities, opportunities exist to increase audit efficiency and effectiveness. Specifically:

- Research objectives should be better defined for successful accomplishment within time constraints. Research objectives did not provide auditors with sufficient guidance to focus on potential problem areas and research time was inadequate to perform in-depth evaluation of an entire weapon system (Chapter 4).

- Criteria for the type of issues most important to weapon system audits should be defined. First line weapon system audit supervisors neither agreed among themselves nor with Air Force Audit Agency practices regarding the most

meaningful audit success factors, such as monetary savings (Chapter 5).

- Critical weapon system functional areas that require increased audit emphasis should be identified. Audit manager's research focused on weapon system functions that first line supervisors believed less important. On the other hand, areas considered most important by program managers were not always researched (Chapter 6).

- Important weapon system issues should be specified by priority. Program managers defined 40 specific issue areas, such as Training Requirements, that should usually be reviewed during the research phase. However, audit managers indicated little preference in performing research for 29 of those areas (Chapter 7).

When compared to other audit organizations, the results expected from Air Force Audit Agency research is not proportionate to the resources applied. For example, Naval Audit Service research is performed by teams consisting of one GM-13 and two GS-12s, the Department of Defense Inspector General for Audit employs teams headed by GM-15s and GM-14s, and the General Accounting Office also uses a research team concept. To offset the resource imbalance, increased emphasis on the situations above would direct Air Force audit managers toward more important weapon system issues. However, improved audit manager performance will require more pre-research effort to specifically define research phase objectives.

Introduction

WEAPON SYSTEM AUDITS

The complexity of performing an audit can be measured by the difficulty of understanding the subject audited. Weapon systems are complicated. In 1968, former Deputy Secretary of Defense David Packard stated, "there had been bad management of many defense programs [weapon systems] in the past...[and] frankly...we have a real mess on our hands" (3:6). Another leading study several years later by J. Ronald Fox concluded that until the acquisition process was restructured, there would not be responsible weapon system management (3:--). Finally, a 1983 study sponsored by the Council of Economic Priorities found that the Department of Defense had made virtually no progress in solving the problems of weapon system management addressed by Mr. Packard and Mr. Fox (1:20).

Such claims show that weapon system management problems are no secret, but the cures have been elusive. These same complications confront an auditor attempting to evaluate the weapon system process. System complexity coupled with the requirement to evaluate real time program results make weapon systems a most difficult area for audit. Unfortunately, many auditors do not recognize the intricacies of performing weapon system reviews. Included among these auditors are the Air Force Audit Agency's (AFAA) policy makers. As a result, the research methods used to structure a weapon system audit do not differ from techniques used in simpler areas.

Research forms the foundation for effective audit and ensures that limited resources are placed where most urgently needed. Under normal circumstances, research effort provides the basis for every subsequent audit step and the information necessary to predict final audit results. Research improperly executed will reduce auditing efficiency and decrease the probability of detecting any significant management problems (9:38). While traditional financial audits routinely report favorable conditions, operational program results audits costing up to $250,000 require a return on investment (9:38). To ensure an equitable return, an organization must provide sufficient research opportunities and have capable research auditors.

In response to the difficulty of understanding and auditing weapon systems, this project was designed to evaluate the problems audit managers have in defining potential management problems during the audit research phase.

The first three chapters provide some insights to the complexities surrounding weapon systems' management, weapon system audit methodology and the Air Force Audit Agency's organizational structure. The final five chapters show how these complications obstruct the auditor's attempt to research weapon systems.

ANALYTICAL METHOD AND ASSUMPTIONS

Three survey questionnaires were used to evaluate weapon system research procedures within the AFAA Acquisition and Logistics Weapon System Associate Directorate (QLW). One survey measured the weapon system knowledge of QLW audit managers, another assessed the weapon system areas most important to QLW program managers (first line supervisors), and the final survey provided the weapon system research procedures used by other audit agencies. A total of nine audit managers, three program managers, and four audit agencies were surveyed with a response rate of 100 percent. Appendix A provides the survey questionnaires and Appendix B the survey analyses.

There were several inherent assumptions to this study. These were:

- The questions used to measure variables were reliable.

- The questions were answered correctly and honestly.

- The recommendations were within QLW authority limitations.

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Chapter One

WEAPON SYSTEM MANAGEMENT STRUCTURE

The overall management hierarchy of a weapon system is more complex than most other Air Force functions (28:5,6). Two principle factors complicate weapon system understanding. One is the management structure and related responsibilities within the structure. The other is understanding those functions required to effectively develop, acquire, and deploy a weapon system. It's best to look at the management structure in two stages: the Air Force at large and the program office. The source of information for data presented in this chapter was AFR 800-2, "Acquisition Program Management" (12:--) and AFSCP 800-3, "Acquisition Management" (13:--).

WEAPON SYSTEM MANAGEMENT WITHIN THE AIR FORCE

The ultimate approval for weapon system development and acquisition lies with the President and Congress. The Air Force function is to identify the needs, sell the ideas, and deliver the approved system for operational use. A macro view of weapon system management within the Air Force (Figure 1) shows a very large horizonal and vertical linkage in the chain of command. This linkage provides a series of checks and balances to ensure systems in the development pipeline represent legitimate user needs. The primary participants of weapon system development are listed below.

UNITED STATES AIR FORCE (USAF). All major weapon systems in the development phase have a representative at HQ USAF. The program element monitor (PEM) serves as the HQ USAF (Pentagon) focal point and is generally the program sponsor during final budget decisions and Congressional inquiries. The PEM is responsible for developing program management directives, identifying system specifications, and documenting any other user requirements. Program directives provide system development and production authority as well as any constraints.

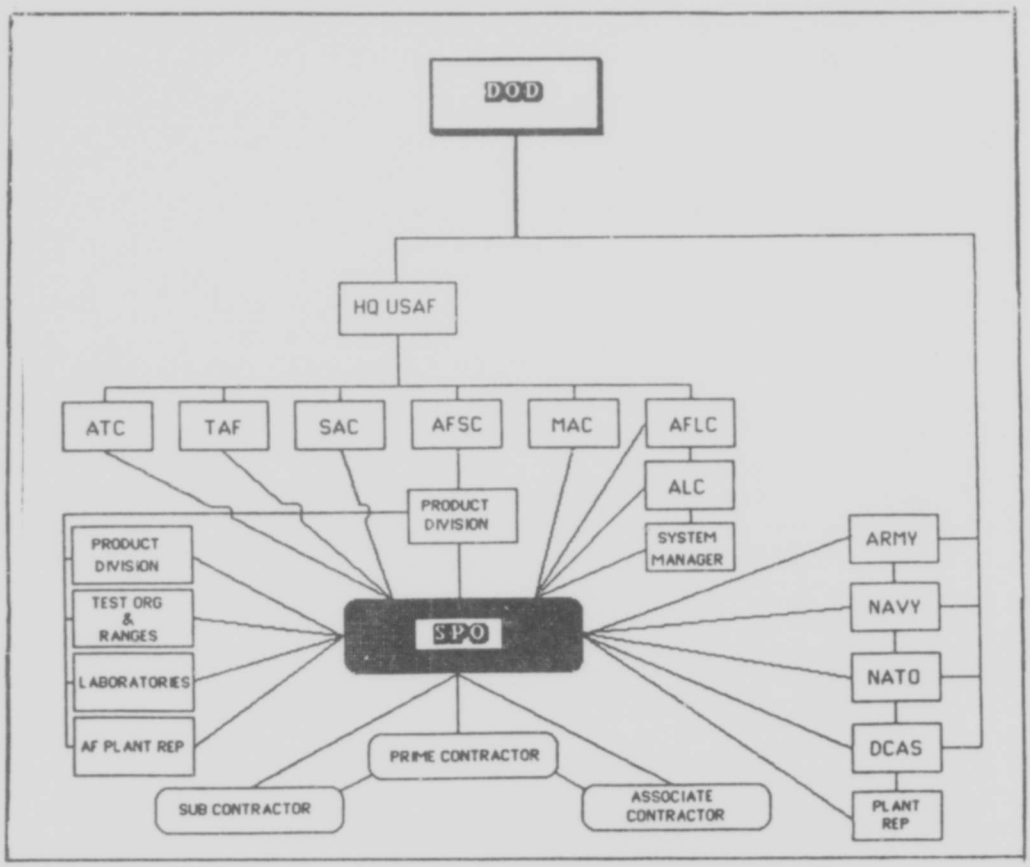

FIGURE 1 SPO INTERFACE

AIR FORCE LOGISTICS COMMAND (AFLC). The maintainability and supportability requirements for all weapon systems must be coordinated through HQ AFLC. In addition, a plan exists for the transfer of major weapon system program responsibility to an ALC system program manager once development effort is complete.

USER COMMAND. The user command is responsible for ensuring the system meets current and projected needs within the threat spectrum. In addition, the user command must agree that the system will perform within given operational constraints.

AIR FORCE SYSTEMS COMMAND (AFSC). Program managers act as implementing officers for AFSC and must coordinate the ultimate system requirements between participating commands. In accordance with AFR 800-2 "Acquisition Program Management," the manager is responsible for executive planning, organizing, directing, and controlling all executive program activity outlined in the program management directives.

AIR TRAINING COMMAND (ATC). ATC coordinates on training concepts and requirements. ATC also assesses the relationships and potential trade-offs involving cost and risk in meeting initial operational capability milestones.

AIR FORCE OFFICE OF TEST AND EVALUATION CENTER (AFOTEC). AFOTEC provides ongoing independent weapon systems assessments during the development phase. The Center's responsibilities include planning, directing, conducting, controlling, and evaluating system performance.

PROGRAM OFFICE

Direct management responsibility, authority, and accountability for attaining program objectives rests with the program manager. AFR 800-2 defines the concepts used for establishing a system program office and has resulted in a matrix management format. As shown on Figure 2, two primary flows of authority exist within the matrix format. Vertical authority flows from functional managers to the individuals temporarily assigned to program offices. Project authority flows horizontally (26:6). The primary functional responsibilities within a program office are listed below.

PROGRAM CONTROL. Program control has responsibility for scheduling programs, budgeting and managing funds, evaluating contractor status, estimating life cycle cost, and maintaining the central depository for all program documentation.

PROCUREMENT. Procurement has responsibility for contract management, negotiations, and contractor performance evaluation reports.

ENGINEERING. Engineering has responsibility for integration of the system and subsystems, system technical evaluation, and specialty programs (i.e., safety, reliability, survivability, quality assurance, human factors, and trade-off studies).

CONFIGURATION MANAGEMENT. Configuration management has responsibility for establishing and implementing policies and procedures for weapon system configuration (i.e., engineering drawings, specifications, and hardware configuration status). This office manages engineering changes to documentation and hardware and also receives, reviews, and processes engineering change proposals to affected agencies.

TEST AND EVALUATION. Test and evaluation has responsibility for test planning, system and subsystem testing, and flight testing.

LOGISTICS. Logistics has responsibility for logistic supportability, life cycle cost decisions, and provisioning for operational support.

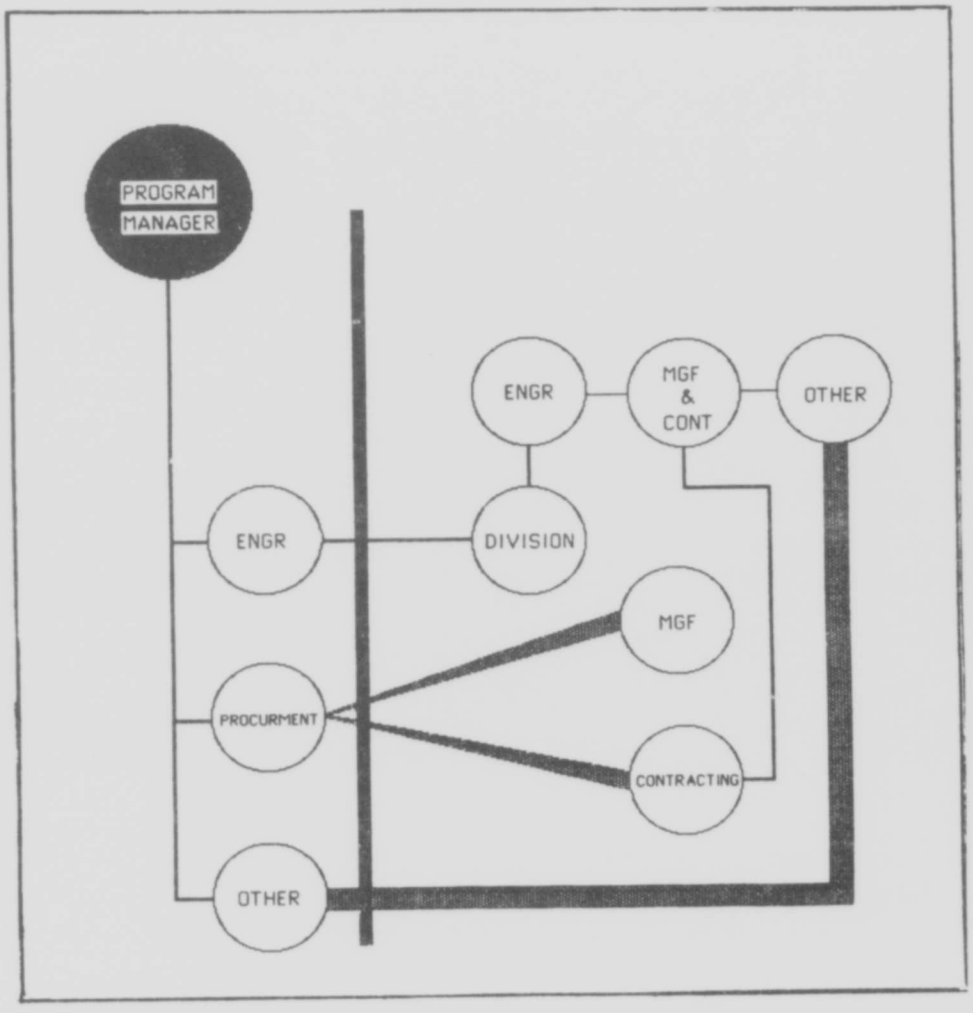

FIGURE 2 MATRIX ORGANIZATION

Overall, fourteen functional areas were evaluated in this study. Weapon system audits generally focus on one or two of these functional areas. Furthermore, audit coverage does not encompass an entire area, but concentrates on selected issues within each function. The primary functional areas are presented below, the issues are presented in the audit manager's survey, Part I.

A. Program Control
B. Procurement
C. Engineering
D. Configuration
E. Testing
F. Manufacturing
G. Logistics
H. Interface
I. Data
J. Intelligence
K. Communications
L. Deployment
M. Contracting
N. Training

MATRIX MANAGEMENT

Although used for weapon system development, matrix management has limited use because of implementation difficulties. The indirect superior/subordinate relationship and lateral decision network create personnel resistance, increased internal conflict, and problems with establishing a power balance (26:6). Yet, these problems are outweighed by the need to have a management system flexible enough to overcome technically complex programs through the dynamic weapon system phases (conceptual, validation, full-scale development, and production) (26:7).

Air Force willingness to use matrix management in lieu of the more traditional direct command approach provides some insight to the difficulty of managing a weapon system. These same problems confront the weapon system auditor.

Auditors must understand the interrelation of the program office and commands. The difficulty comes in matching a problem to the related cause. In many cases a system problem in one command is caused by the actions of another command. For example, development specifications may require built-in detection and isolation of system failures in circuit cards of electronic components. Accordingly, the using command's operational plan calls for minimal test equipment, lower maintenance personnel skill levels, and circuit card replacement spares. However, if the built-in test capability does not perform as planned, the operational plan may not be workable. For the weapon system auditor, a multi-fronted issue has also developed: what went wrong with contractor development; what are the correction costs; why did the testing procedures fail to

detect the problem; are spares' requirements affected, et cetera.

Answers to these questions require cross communications and examination of the actions between all participating commands and HQ USAF. Furthermore, the auditor must develop a recommended solution that also prevents recurrence. The audit methods used to evaluate weapon systems are briefly discussed in the following chapter.

Chapter Two

WEAPON SYSTEM AUDIT METHODOLOGY

Weapon system audits evolved from the need to align management evaluations to program results. These system audits place emphasis on determining "whether (a) the desired results or benefits established by the legislature or other authorizing body [were] being achieved and (b) whether the agency has considered alternatives that might yield desired results at a lower cost" (11:12). While this process ensures full accountability, the concepts and areas of audit coverage are evolutionary for the auditing profession (6:82). The auditing is generally more difficult and requires a level of expertise beyond the standard accounting framework used by traditional auditors (9:38).

MEASURING ACCOUNTABILITY

Traditional financial audits measure the accuracy of objective historical data and determine the effectiveness of management's planning and controlling functions (5:44). The methodology allows auditors to equate good accounting controls to good management (5:44). Whether good management decisions resulted from the data is irrelevant. On the other hand, program results audits use historical data to evaluate and analyze management actions beyond planning and controlling (6:80). Emphasis is placed on determining whether effective decision making procedures exist to ensure final results will match predetermined objectives. More specific comparisons between traditional and program results auditing are presented on Table 1.

PROBLEM DETECTION

Unlike traditional audits that rely on true/false conditions from accounting inaccuracies or noncompliance events, operational audits have no clearly defined standards or magic formula to identify significant system problems (7:110). Within weapon

COMPARISON OF
TRADITIONAL FINANCIAL AUDIT
TO MANAGEMENT AUDIT

TRADITIONAL FINANCIAL AUDIT	MANAGEMENT AUDIT
The auditor is expected to:	The auditor is expected to:
- Determine the adequacy of the system of internal control.	- Assure that plans (as set forth in statements of objectives, programs, budgets, and policies) are comprehensive, efficient, effective, consistent, and understood at the operating levels.
- Investigate compliance with procedures.	- Provide objective information on how well plans and policies are being carried out.
- Verify the existence of assets, see that proper safeguards for assets are maintained, and prevent or discover fraud.	- Assure that all operating reports can be relied on as a basis for action and are timely and accurate.
- Check on reliability of the accounting and reporting system.	- Furnish information on weaknesses in administrative controls, particularly as to possible sources of waste.
- Report results of operations and/or of financial position.	- Provide aid in measuring the efficiency of operations by feedback of appropriate information.
	- Report the existence, adequacy, and implementation of management controls and decision-making procedures.

TABLE 1 FINANCIAL AND MANAGEMENT AUDITS (2:--; 4:9-3)

systems, such problems generally result from complex issues requiring multiple command interaction. Consequently, experience is essential. Only the best and most experienced auditors are capable of detecting operational problems where intuition is usually the best guide (9:38). Inexperienced auditors may not recognize a problem or could be talked out of the issue by management (9:38).

Program results audits usually link sensitive issues to management decisions rather than internal control weaknesses. Two concerns emerge from such linkage. One, the final audit report should connect potentially significant problems to specific individuals and program directors. Absence of this linkage usually indicates poor audit work or an attempt to avoid direct confrontation by the auditor (8:22). On the other hand, managers do not wish to appear inept and will rarely agree to audit conclusions (10:38). As a result, management does not regard weapon system auditors as part of the Air Force team and will attempt to conceal significant problem areas (25:29). This leads to the more important second concern, how are problems detected and supported?

Chapter Three

AIR FORCE AUDIT AGENCY STRUCTURE

ORGANIZATION

The Air Force Audit Agency's (AFAA) mission is to evaluate managerial effectiveness in: 1) fairly presenting the financial position; 2) economically and efficiently utilizing resources; and 3) achieving desired program results (11:--). AFAA uses a centralized organization structure as shown in Figure 3 to accomplish this mission. The Acquisition and Logistics (QL) and Forces and Support Management (FS) directorates manage all centrally directed audits. Each has five associate directorates (ADs) with specific audit responsibilities.

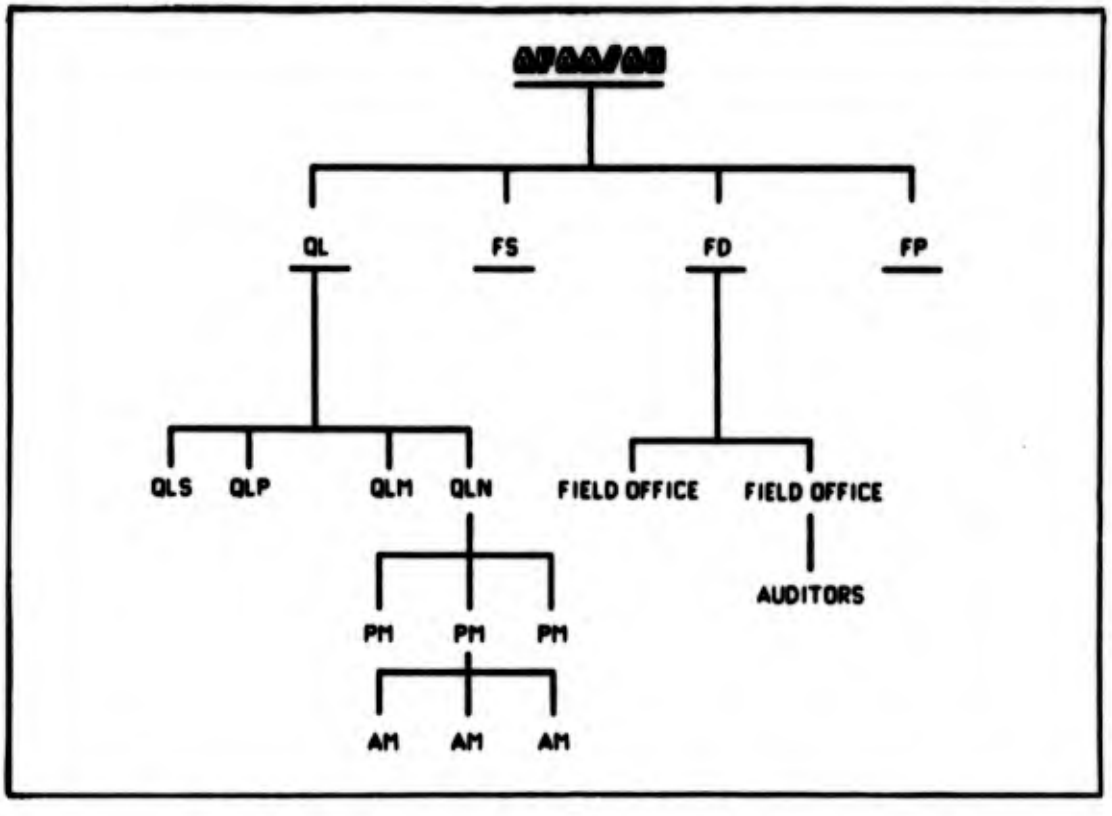

FIGURE 3 AFAA ORGANIZATIONAL STRUCTURE

Most QL ADs audit major functional areas. For example, QLM has responsibility for maintenance audits while QLS has responsibility for supply audits. These functional audit areas are usually traditional internal control reviews of financial management and economy/efficiency reviews. QLM and QLS auditor expertise and experience center primarily on their respective functional areas.

The QLW AD audits weapon systems. Areas of QLW responsibility include maintenance, supply, and all other weapon system management functions. While QLW may examine financial records, most audits focus on either economy/efficiency reviews or program result assessments. Figure 4 illustrates the responsibility differences between QLW and other QL ADs. For example, QLW evaluates the interrelations between maintenance, supply, and acquisition to determine system effectiveness. QLM, on the other hand, evaluates the maintenance program of a single system or the Air Force procedures involving several systems.

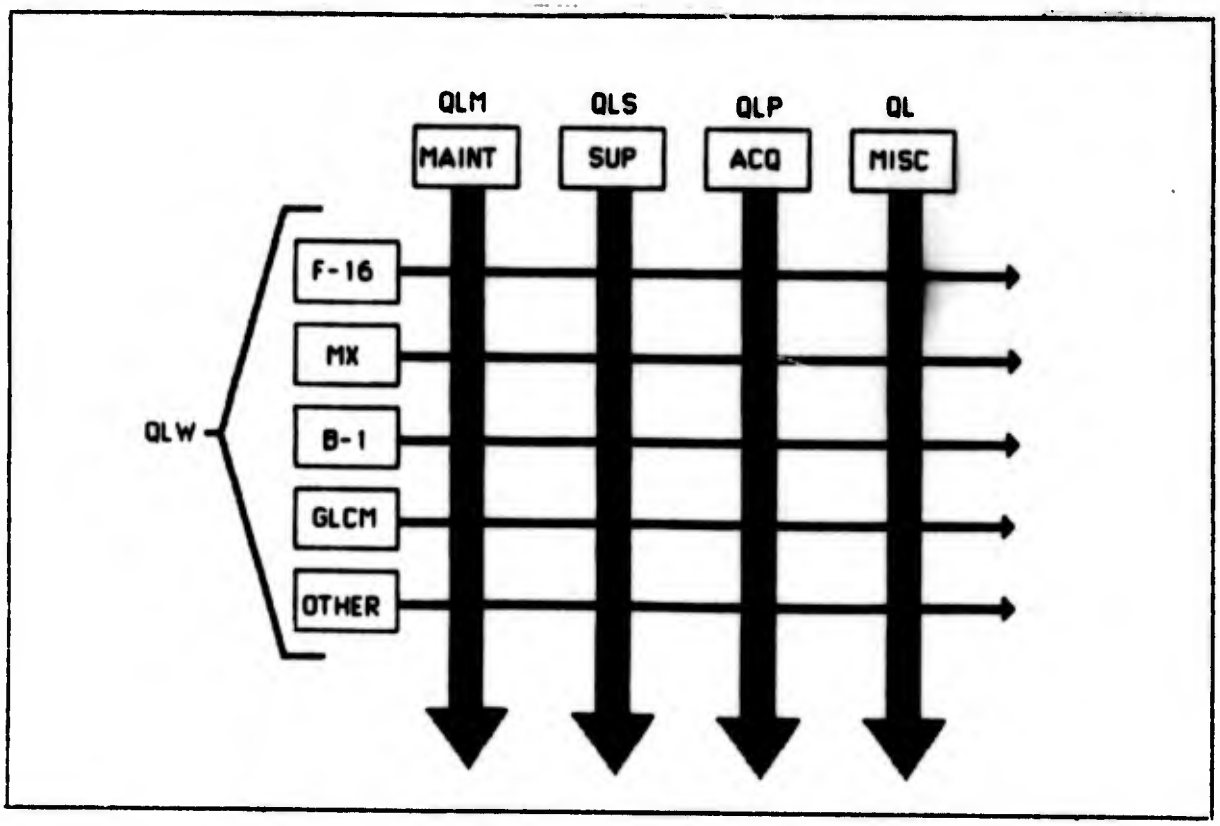

FIGURE 4 AUDIT RESPONSIBILITIES

AUDIT APPROACH

AFAA uses a six phased approach to auditing (14:--). Initial phases are used to identify major issues as possible audit candidates while intermediate phases encompass the detailed audit evaluation process. The final phases culminate into the report of audit. Specific phases are addressed below.

ISSUE SELECTION. Associate directors and program managers compile information from such sources as congressional documents, the Five-Year Defense Program, and audit manager input to identify potential audit issues. Selection of an issue is based on its related magnitude, resource commitment, mission impact, internal and external interest, and so forth.

VALIDATION RESEARCH. Audit managers normally work alone during a 45 to 90 day research phase. Research results provide the basis for AFAA management's decision to either proceed with a full audit or go to another area. Successful research should identify specific potential problems, develop an approach for further in-depth audit work, and determine audit resource requirements.

For all potential problems the researcher must also estimate the underlying causes and potential corrective recommendations. Enough information must be gathered to define the issues, related systems, and command interplay. Such information is essential to develop an audit plan and coordinate the activities of auditors working different segments of an issue in separate major commands. For weapon system audit managers, such research effort falls only slightly short of audit application because analysis concentrates on management decisions. On the other hand, functional area audits usually focus on transaction analysis through sampling techniques to locate problems. The sample results are then used to project the problem across the Air Force spectrum.

Once potential problems are defined an audit plan must be formulated. Audit plans for functional type audits may simply duplicate the sampling processes used during research. While some duplication is possible for weapon system audits, the plan must focus primarily on those analytical processes that must be used to evaluate command interaction.

Developing resource and milestone requirements is the third major research objective. The audit manager must coordinate issue difficulty with the capabilities of available field auditors. An inadequate match will impact the audit schedule and

the number of complex issues that can be addressed. The weapon system audit manager must also ensure that auditors at the various commands provide integrated results. For example, audit data from the user location may feed logistic's auditors who in turn provide data to the program office auditors (14:3--).

PROGRAM DEVELOPMENT PHASE. The program development phase provides audit managers 30 days to document the audit objective and task requirements. The audit program ensures a fully coordinated effort and defines the responsibilities of each field auditor (14:5-1).

APPLICATION PHASE. The purpose of audit application is to gather detailed information to either substantiate or disprove research conclusions. The application phase runs from 90 to 120 days and usually requires 3,000 to 4,000 audit hours to complete (14:4-1).

VALIDATION PHASE. To ensure the accuracy of facts gathered during audit application, all potential findings and supporting evidence are outbriefed to Air Force management. Thirty days are provided for the validation phase (14:7-1).

REPORTING PHASE. Once all facts have been validated the report writing process starts. Audit managers have 30 days to prepare a draft audit report (14:7-1).

RESEARCHER'S CAPABILITY

As readily evident, research provides the foundation for all other audit effort. However, the research phase is not a simple task. While no formal penalty exists for audit managers misjudging potential problem areas, pursuing ill-defined issues creates resource waste.

Audit manager research success depends on understanding the subject area and in establishing reasonable research objectives. As outlined in previous chapters, weapon system audits encompass the combined difficulty of measuring weapon system program results across multiple functional areas. As a result, on a comparative basis weapon system research significantly increases the scope of responsibilities for auditors, yet no corresponding adjustment to the organizational structure or audit phases have occurred.

Chapter Four

RESEARCH TIME CONSTRAINTS AND GUIDANCE

The potential problems identified during research do not provide an adequate basis for weapon system audit application. A random sample from six research efforts found that about half the anticipated problems were disproved during audit application (15:--; 18:--; 19:--; 20:--; 21:--; 24:--). While the actual cost associated with auditing false problems was not measurable, a correlation should exist between the anticipated hours required to perform an audit and the number of potential findings that must be reviewed. Using such a relationship, up to half the hours of a typical audit may have been used to evaluate management areas where no real problems existed. Although the Air Force Audit Agency (AFAA) has no criteria to determine whether a 50 percent ratio is considered satisfactory, the QLW program managers indicated that weapon system research was only marginally effective on question 3 of their survey. Two interrelated causes contributed to the inadequate research: unrealistic time constraints and poorly defined objectives.

RESEARCH TIME

Program managers rated the capabilities of audit managers in each of the five major audit phases. As shown on the bar chart in Figure 5, audit manager research capability was rated only marginal and well below program development, application and validation. However, the sharp contrast between audit manager research and application capabilities was most significant. Both phases rely on the use of similar audit techniques to help achieve successful results. Primarily, an auditor must examine management's decision processes and gather evidence for analysis during each phase. While research evidence may indicate the existence of potential problems and related causes and effects, application evidence should further substantiate that problems exist. Auditors with the expertise to provide acceptable application results should perform reasonably well during research. Therefore, the marginal research phase ratings attributed to audit managers were not based on their inexperience. The other primary variable during research is

time. Indeed, program managers confirmed through survey question 4 that audit managers were not provided enough time to adequately research weapon systems. However, research time criteria is not controlled by program managers.

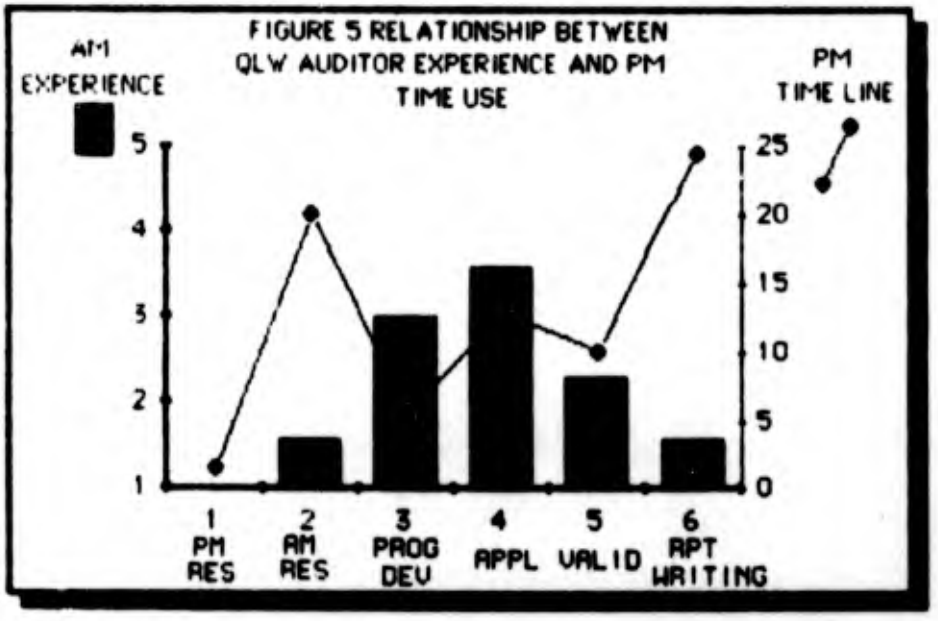

FIGURE 5 RELATIONSHIP BETWEEN QLW AUDITOR EXPERIENCE AND PROGRAM MANAGER TIME USE

To overcome time constraints, program managers increased their interaction with audit managers during the research phase. The time line on Figure 5 was developed from survey question 2 and illustrates the magnitude of program manager's interface during research. As shown, the research phase consumed as much of the program manager's time as the program development and application phases combined. While increased program manager's support during research provides some benefits, it did not clarify the audit manager's task nor offset the time limitations. For example, audit milestones authorize an audit manager up to 600 hours for research during a 6,000 hour project. However, in response to survey question 2, the majority of audit managers indicated this 10 to 1 ratio did not provide enough time to successfully complete audit research. The problem audit managers have with research time constraints is in determining what should be accomplished.

RESEARCH OBJECTIVES

Survey question 1 found that research phase objectives did not provide adequate guidance to limit or direct the audit manager's scope of effort. Planning and budgeting documents were used by program managers as the primary source for most research objectives but only provided visibility to the most costly and important weapon systems. Program managers were unable to identify specific management problems because they had not performed any in-depth evaluation at the weapon system decision making levels. Referring back to Figure 5, program managers were able to devote only about 2 percent of their time to independent research activities. As a result, program managers had only minimal information regarding a weapon system before audit managers entered the research phase.

The lack of research guidance was reflected in the most recent audit manager assignments. In response to survey question 1, eight of the nine audit managers stated that research guidance addressed only the weapon system or the weapon system and general areas of interest (Table 2). The impact on audit managers can be seen by comparing their objectives and responsibilities during the research and application phases. Audit application usually requires 3,000 to 4,000 man hours over a 3 or 4 month period. The application phase is preceded by up to 600 hours of research and 160 hours of program development planning. These planning phases are used to establish specific parameters and focus on central potential problems during audit application. As a result, audit application effort was narrowly defined with a limited scope. On the other hand, research objectives were broadly scoped and required audit managers to use a trial and error approach in locating significant management problems within a weapon system area. This significantly increases the audit managers' responsibilities.

	AUDIT MANAGERS								
	1	2	3	4	5	6	7	8	9
WS ONLY	.	.	x	x	.	.	.	x	.
WS & GENERAL AREA	x	.	.	.	x	x	x	.	x
WS & SPECIFIC PROBLEMS	.	x	.	.	.	.	.	.	.

TABLE 2 EXTENT OF RESEARCH OBJECTIVES DEFINED

The responsibilities of weapon system audit managers in other audit organizations was not so singularly focused. For example, in response to survey questions 7 through 10, the Naval Audit Service, DOD IG and GAO all specified that audit teams led by GM 13s, 14s, and 15s performed research. Among other advantages, the team concept provides a larger experience base and concentrates more resources toward problem detection. While the use of teams helps to quickly focus research objectives, QLW does not have the authority to consistently use such a concept. Therefore, audit managers must have clearly defined research phase objectives. Prior to commencing any research effort, objectives should be established between QLW management and the audit manager.

SUMMARY

To increase research effectiveness, research objectives must be established and attainable within the given time constraints. Since time constraints are established by higher organizational controls, QLW should place more emphasis on defining pre-research objectives. Easily said, but program managers already average more than 40 hours per work week and audit managers' research capabilities are limited. Furthermore, the current practice of using generalized research objectives also affects the types of findings pursued. Although audit managers were left to their own ingenuity in focusing on potential problems, the next chapter shows that audit managers were unaware of the relative importance among potential weapon system problems.

Chapter Five

PROBLEMS AFFECTING THE AIR FORCE

Audit managers had no standards or guidelines to determine which problems were of the most significance to the Air Force. Furthermore, survey question 5 showed that program managers disagreed on the types of problems most critical to weapon system audit success. Without a definition to assess the relative importance of potential problems, an audit manager's research phase objectives has no structured focus towards issues of most importance.

The measure of research effectiveness can be related to whether the final audit report had a significant positive effect on Air Force operations. The difficulty for an audit manager is to distinguish primary Air Force concerns from secondary problems. While neither the Air Force Audit Agency (AFAA) nor OLW had formally defined the types of audit issues believed most important, weapon system program managers were asked to define and rate the factors associated with significant audit findings. Five audit success factors were identified from survey question 5 and the average results are presented in Figure 6.

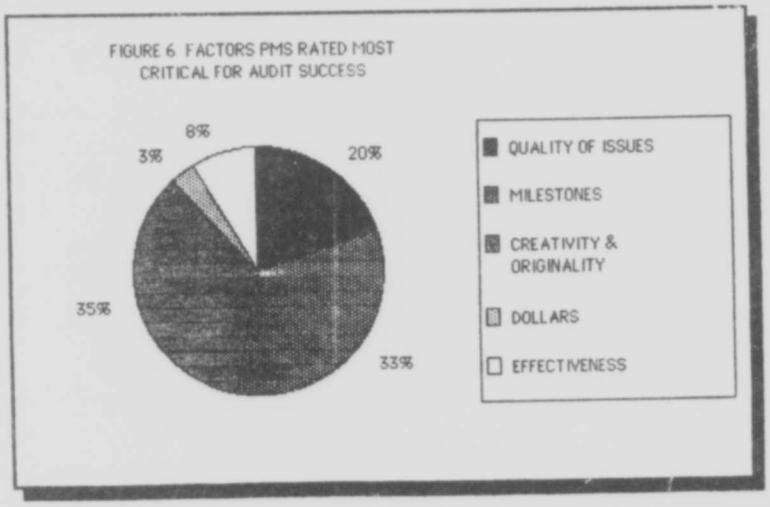

FIGURE 6 PROGRAM MANAGERS AUDIT SUCCESS FACTORS

Casual review of the program managers' averages shows three factors of primary importance to audit success. Two factors, the Quantity of Issues and Creativity/Originality, directly relate to the AFAA impact on Air Force operations. The other factor affecting success centered on completing the audit assignment within prescribed milestones. Milestone requirements do not directly contribute to Air Force effectiveness but focus on internal AFAA evaluation procedures.

While average data pointed to three primary factors for audit success, analysis of individual program manager's responses found little agreement on the importance of each factor. None of the program managers believed all five factors played a role in audit success. Two program managers indicated that only two factors were important, while the other program manager believed four factors were important. The program managers' ratings for each factor are provided in Table 3. As shown, no factor received unanimous program manager agreement over whether it affected audit success. The degree of program managers' differences was significant. For example, the Creativity/ Originality factor was rated the most important factor by one program manager, the second most important by another program manager, but of no importance by the third program manager.

CRITICAL AUDIT SUCCESS FACTORS:	PM 1	PM 2	PM 3
Dollars Involved		10%	
Qty of Issues	50%	10%	
Creat/Orig of Issues		30%	75%
Milestones	50%	50%	
Affectiveness			25%

TABLE 3 IMPORTANCE OF CRITICAL FACTORS, AS RATED BY PROGRAM MANAGERS

To understand the impact of these critical factors, one must understand their meaning and related importance to AFAA. The description below also provides the rationale for program managers' ratings.

DOLLARS INVOLVED. The dollars associated with a finding align audit success with claimed monetary savings for the Air Force. Monetary savings have been of historical importance to AFAA as evidenced by special internal procedures used to track all claimed dollar savings. In addition, there is special emphasis to ensure Air Force management takes the action necessary to realize those savings. Surprisingly, QLW program managers basically disregarded dollars as a critical factor for weapon system audit success. The difference between the QLW and AFAA positions rests with the type of audits performed. As explained in earlier chapters, weapon system audits measure program results against a stated mission capability. Such evaluations may have significant impact on the Air Force but are impossible to measure monetarily. For example, cost savings would be immeasurable for an audit finding associated with poorly defined system specifications. However, the probable degradation of mission capability would require a costly contractor "get well" effort.

QUANTITY OF ISSUES. The quantity of issues associates audit success with the number of findings reported. The rationale appears fairly simple. Since all QLW reports address issues resolved only at major command or HQ USAF levels, all have considerable importance. While one program manager considered the quantity of issues as a primary factor in audit success, another program manager felt this factor was of marginal significance. Yet, the third program manager did not believe a correlation existed between audit success and the quantity of issues.

CREATIVITY/ORIGINALITY OF ISSUES. The Creativity/Originality factor measures audit success with developing ideas or concepts new to either Air Force weapon system managers or to auditors. For example, several years ago an audit report identified a multi-million dollar savings potential through component breakout (22:14). Component breakout is still frequently audited even though the approach has little Creativity/Originality. Creativity/Originality received the highest average among program managers. However, a significant range existed between the three ratings. One program manager rated Creativity/Originality as 75 percent of the basis for achieving audit success. Another showed Creativity/Originality as a major factor (35%) in audit success while the third program manager believed there was no relationship between audit success and this factor.

MILESTONES. Milestones are developed for each of the five major audit phases (research, program development, application, validation, report writing). AFAA places great importance in accomplishing audits on schedule and continuously monitors audit progress. There are two primary reasons for milestone importance. One, audit plans must be carefully coordinated with field offices to ensure personnel are available to accomplish every project. Overrunning scheduled completion dates disrupts resource plans and future audits. The second reason revolves around audit production. Overrunning milestones means a delay in starting the next audit project. Two program managers indicated that milestones attributed to half the success of an audit. Yet, the third program manager disregarded milestones as a factor of success.

AFFECTIVENESS. Affectiveness aligns audit success to whether management is convinced a real problem exists and takes the appropriate corrective action. One program manager identified Affectiveness as a major factor of success while the other two program managers placed no value in this area. (Note: Affectiveness was not listed as a critical factor for program managers to assess. The program manager noting Affectiveness as a major factor of success listed it under the "Other" catagory.)

SUMMARY

Differences of opinions can be expected whenever professionals attempt to evaluate subjective data. However, QIW program managers, the first line supervisors for weapon system audits, appear to have completely divergent philosophical concepts rather than opinion differences. For example, not one critical success factor was identified by all three program managers as having any significant impact on audit success. These responses show a lack of unity within weapon system audit management and indicate the best audit approach has not been defined. As a result, program managers could degrade overall audit manager performance because of the inherent influence in the supervisor/subordinate relationship. Audit managers could meet the expectations and desires of their supervisor, yet fail to receive recognition as a top performer by higher level AFAA management. More importantly, audit managers do not have clearly defined indicators to use in determining where research emphasis should be placed.

Chapter Six

WEAPON SYSTEM FUNCTIONAL AREA PRIORITIES

The previous chapter found that audit managers were provided significant flexibility in selecting research objectives. However, audit managers' responses to Part I of the survey showed they were unaware of the weapon system functional areas most important to program managers. As a result, audit managers minimized their research effort in the most important weapon system functional areas. Figure 7 shows the importance of each weapon system functional area to program managers and audit managers.

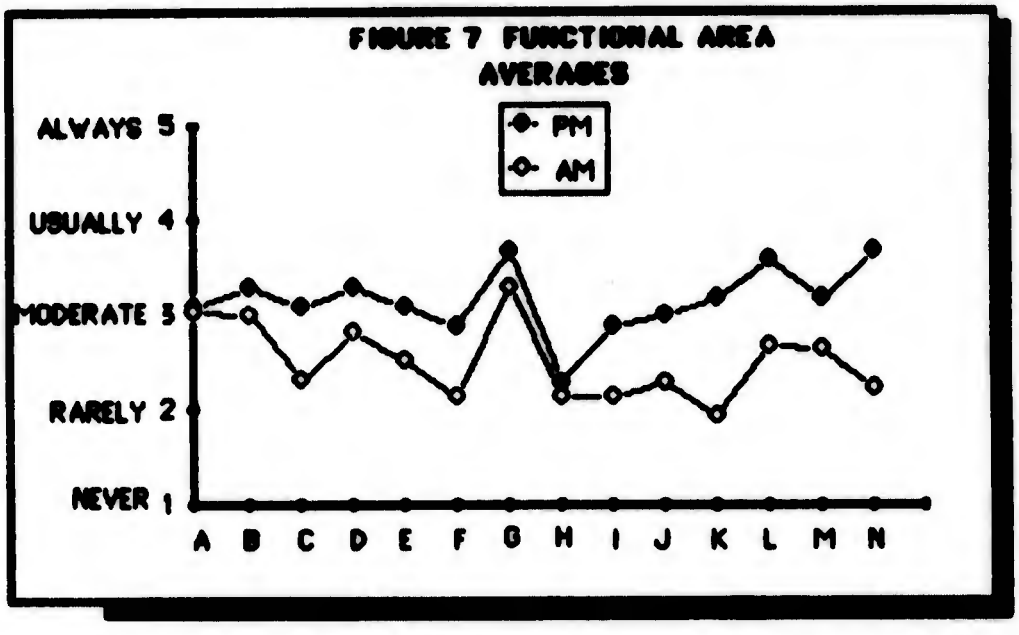

FIGURE 7 PROGRAM MANAGERS AND AUDIT MANAGERS FUNCTIONAL AREA AVERAGES

All functional areas were rated higher by program managers than audit managers. The high ratings by program managers should indicate those functional areas where potential problems would most likely occur. Such a conclusion is supported by the fact that individuals were selected program managers because of their greater experience and expertise in weapon system auditing. If so, then program managers' ratings should also indicate the areas of greatest weapon system importance.

Even though program managers' ratings were higher, comparison of the relative rank order for each functional area has significant importance. For instance, the area rated number one by program managers should also be a very highly rated area by audit managers. The area of least importance to program managers should be of little interest to audit managers, and so forth. This relationship is important because most audits must focus on one of the primary functional areas represented in Figure 7. For example, program managers rated Integrated Logistics Support (issue G) as an area that should usually be evaluated during research. Audit managers rated Integrated Logistics Support only moderately important. However, of the fourteen functional areas reviewed Intergrated Logistics Support received the highest rating among audit managers. Therefore, audit managers would most likely include Integrated Logistics Support in their research effort. In this instance, the high rank order relationship between program managers and audit managers has more importance than the actual rated values.

Analysis of the other weapon system functional area relationships does not always find such a favorable correlation. There were four areas where audit manager research would not be performed in proper relation to program managers' rated importance.

TRAINING. Program managers regarded Training as the most important weapon system research area along with Integrated Logistics Support. However, audit managers had nominal expertise in this area and indicated little preference to addressing Training as an audit research topic. Overall, Training was the third least likely area for research by audit managers. A review of the results from nine randomly selected research efforts supports this conclusion (15:--; 16:--; 17:--; 18:--; 19:--; 20:--; 21:--; 23:--; 24:--). These nine research efforts had a total of thirty-eight potential findings, however, the Training area was addressed only once.

COMMUNICATIONS AND ELECTRONICS. Program managers identified Communications and Electronics as the sixth most important research area. On the other hand, audit managers rated

Communications and Electronics the least important area in weapon system audits. The indications that audit managers would not research Communications and Electronics was confirmed in actual practice. Of the thirty-eight potential findings sampled, none involved Communications and Electronics.

PROGRAM CONTROL. Program managers rated Program Control in the bottom half of priorities. However, audit managers rated Program Control the second most likely area to concentrate research effort. Of the thirty-eight sampled potential research findings, six involved Program Control.

DATA MANAGEMENT. Program managers rated Data Management as one of the two areas of least importance. On the other hand, Data Management was among the audit managers' top priorities. Due to the peculiar nature of data and its related impact on issues such as component breakout, the actual involvement of Data Management as a research issue could not be determined from research summary data.

AUDIT MANAGER, PROGRAM MANAGER RESEARCH INTERFACE

Recalling that program managers have considerable interface with audit managers during the research phase (see Figure 5), then why was there such marginal control over the weapon system functional areas researched? The answer lies in the program managers' method of interface. Because of their limited in-depth knowledge of a particular weapon system, program managers mostly review the ongoing research efforts of audit managers to determine whether results were significant enough for audit. As such, program managers could terminate further research in any area without specifically addressing where the research effort should have been redirected.

In the absence of formal direction, audit managers usually research those functional areas where they have the most knowledge. This pattern was identified in Part I of the audit managers' survey and is shown graphically in Figure 8. In almost all cases, audit managers' knowledge and willingness to research a functional area were rated about equal and had a very close relationship. In only two areas did audit managers show a significant inability to accomplish the desired research. These were the Intergrated Logistics Support (issue C) and Deployment Management (issue L) areas. Of worthy note, these two areas were highly rated by program managers and indicate a positive information flow to audit managers. It could be concluded that

if audit managers remained in place long enough to gain experience comparable to program managers, then the most important functional areas would receive audit research coverage. However, the current turnover rate of one audit manager every six months has not provided the required stability.

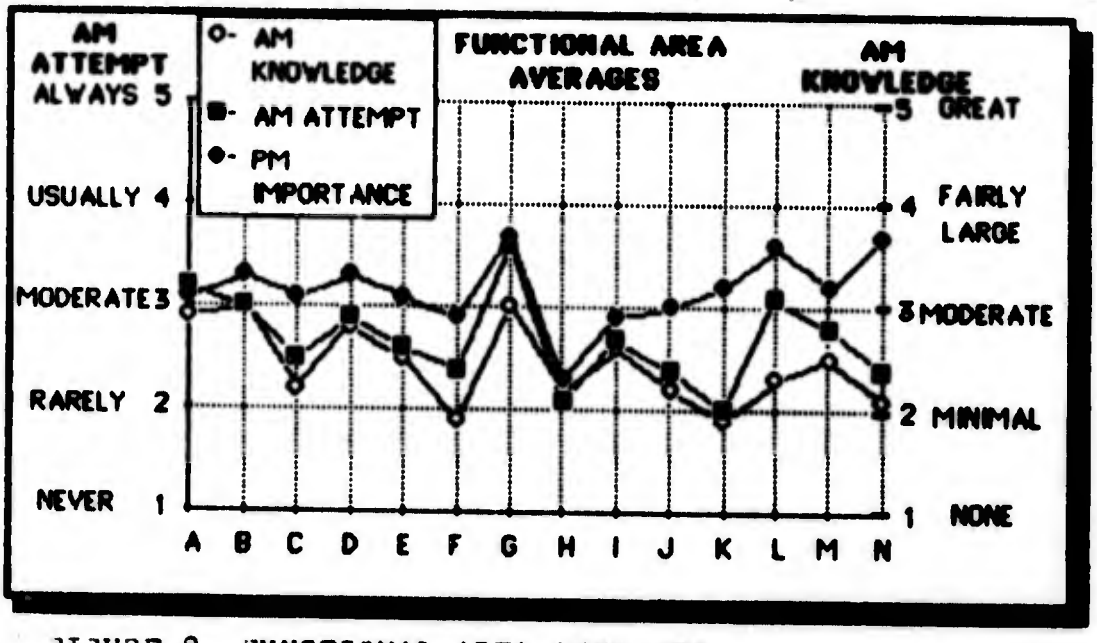

FIGURE 8 FUNCTIONAL AREA AVERAGES

SUMMARY

The review of functional areas provides useful data for developing general trends and showing where future research effort will be directed. However, the variance in audit managers' expertise creates an overly positive bias in the trend data. Four audit managers rated their overall knowledge level above the moderate level, whereas four others rated their knowledge level as very limited. While these differences were reflected as average data, the less skilled audit managers may have significantly more difficulty in directing research effort towards the critical issues. Furthermore, even those audit managers with higher expertise levels showed weaknesses in their ability or willingness to research the audit issues judged most important by program managers. To account for this bias, a review of issue areas and related audit managers' research capabilities is presented in the following chapter.

Chapter Seven

WEAPON SYSTEM ISSUE PRIORITIES

Audit managers were unaware of the issue areas considered most important by program managers. Analysis of the weapon system issues identified on Part I of the survey found that over half of the audit managers would not research the 40 areas rated most important by program managers.

Given a choice of weapon system issues to research, audit managers' decisions should be predicated on two constraints. One constraint is whether the audit manager believes an area will produce any tangible results for further audit application effort. The rationale for this constraint is based on the overall objective of weapon system audits, to find significant management weaknesses. Those areas producing relatively insignificant problems would not result in a report. Also, under most circumstances audit managers would focus research effort on those areas QLW management believed most important. As previously discussed, however, such direction is neither provided with assignment notices nor available as QLW policy guidance.

The other constraint is expertise. As previously noted, the research period does not provide adequate time for both learning a new functional area and also evaluating the adequacy of weapon system management in the related area. To attempt such a venture would most likely result in milestone slippage, one of the more critical factors leading to less than successful audit manager performance. These two constraints show that research of the most important weapon system issues depends on the audit manager's understanding of the importance and knowledge of each issue area.

A comparison of the issues considered most important by program managers to the research constraints of audit managers is shown on Figure 9. The Y axis represents program managers' relative values of importance. For example, a factor of 3.0 indicates an area that should be given occasional research attention; a factor of 3.5 indicates an area of significance and worthy of audit research in many instances; 4.0 indicates an area that should usually be researched; and so on. The X axis ranges

from 0 to 9 and represents the number of audit managers constrained from researching areas regarded most important by program managers. The data (numbers) within the chart represent issue areas. For instance, the X, Y coordinate 7, 4.0, has a value of 3. Interpreted, seven audit managers were incapable of researching three issue areas designated by program managers important enough to almost always review.

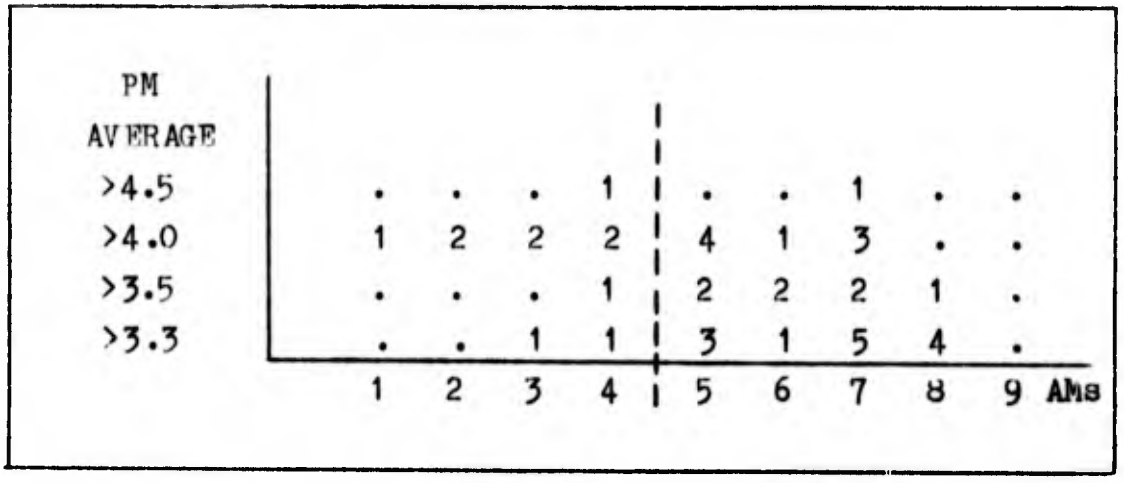

FIGURE 9 AUDIT MANAGER'S ABILITY TO ACHIEVE AUDIT SUCCESS IN AREAS MOST IMPORTANT TO PROGRAM MANAGERS

From Part II of their survey program managers rated 40 of 73 issue areas with a relatively high rating of 3.3 or greater. Such a rating indicates that those areas should be researched. However, the audit managers' responses to Part I of their survey showed that a majority would not focus audit research effort on 29 of the 40 high priority areas. These numbers are represented on Figure 9. The sum of all data numbers is 40 and represent the program managers' high priority issues. The numbers to the right of the dashed line represent those issues where a majority of audit managers were constrained from any likely research. Analysis of where audit managers place research emphasis and their expertise provides some insight on the constraints restricting review of the most important issue areas.

AUDIT MANAGER'S RESEARCH EMPHASIS

Audit managers appeared unaware of the issue areas most important to program managers. This becomes evident when comparing the 40 issues most important to program managers to the number of instances where five or more audit managers would not research those areas. For example, program managers believed audit research should usually include evaluation of weapon system Training Requirements (issue 71). However, audit managers placed only minimal value on this issue. One audit manager indicated Training Requirements would not be researched while five others stated the issue would receive little attention. In another instance, program managers highly valued the need to review Computer Hardware and Software Acquisition (issue 15). On the other hand, one audit manager would exclude this issue from research while four others would give it little attention. Overall, there were 14 issue areas where 5 or more audit managers believed the relative research value was insignificant even though program managers rated the areas very important.

Audit managers' research emphasis usually corelated with their expertise as shown on Figure 8 (Chapter 6). However, instances were noted where audit managers expressed a great deal of knowledge, yet resisted the idea of researching those areas. For example, Configuration Control (issue 31) was regarded as an important area by program managers. However, five audit managers with adequate knowledge to research Configuration Control did not believe the issue worthy of research effort. Better communications between program managers and audit managers would have corrected this problem. Overall, better audit manager's understanding of the critical issues would move nine additional issue data items to the left of the dashed line on Figure 9. The remaining 20 issue areas on the left side of Figure 9 present a more difficult problem.

AUDIT MANAGER EXPERTISE

Audit manager inexperience was the primary factor preventing research of the issue areas considered most important by program managers. For example, program managers considered the evaluation of weapon system Test Result Assessment (issue 38) the number one audit research issue. However, audit managers lacked the basic knowledge to review test assessments during research. Of the nine audit managers, seven had little knowledge of the issue. In another example, program managers believed Training Equipment (issue 72) should generally be a research subject. However, five audit managers expressed having absolutely no

knowledge of the area. Overall, five or more audit managers lacked the expertise to research half of the 40 primary issue areas identified by program managers.

The lack of expertise was not restricted to just a few audit managers. Although four audit managers had high average knowledge factors, these individuals still showed a lack of expertise in 25 percent of the 40 most important issues. The other audit managers showed an expertise gap in about 80 percent of the important issues. Furthermore, the lack of expertise was not limited to just a few functional areas. Instead, audit managers' inexperience involved issues within ten of the fourteen major weapon system functional areas. The breadth of these limitations reduces the opportunity for a speedy training program to cure the problem. On the other hand, a gradual learning process to bring up the expertise levels will be difficult because of the audit manager turnover rates.

SUMMARY

Since audit manager research capability had never been previously evaluated, no standard existed to assess QLW staff performance or identify positive or negative changes. However, another significant question is whether the current research process provides positive or negative motivation for audit managers. While this study did not attempt to evaluate the effects of job security on motivation, a 1981 study on the causes of high AFAA turnover found that job security was the highest auditor need deficiency. AFAA auditors rated the lack of job security 2.5 times greater than any other group of charted government accountants (GAO, etc.). The study concluded that since both groups were "protected in their positions by civil service provisions, the differences between the scores assumes major proportions" (27:99). A 1983 follow-up study found marked improvement for AFAA, but not for weapon system auditors (29:--). Unfortunately neither study evaluated the combined effects of audit managers' capabilities, the audit process, and the area of audit responsibility to determine why selected auditors rated job security extremely low. However, examining job security in light of the weapon system research process shows an interesting relationship. The research process matches an audit manager's least effective capability to the most important audit phase, thus maximizing the risk of not detecting problems and ultimate project failure. Audit managers may link project failure to job security.

Chapter Eight

CONCLUSION

The Air Force Audit Agency (AFAA) QLW supervisory staff is a highly professional group averaging 10 to 15 years of experience in managing weapon system audits. Audit managers are not so experienced. The AFAA reorganized in 1981 and placed great emphasis on increasing the number of weapon system audits performed annually. To satisfy the increased level of effort, individuals with three years or less experience in weapon system auditing were promoted to audit manager positions. While their auditing capabilities were outstanding, their awareness of the most important weapon system functions and issues was insufficient to provide a high percentage of correct and essential conclusions within the normal research policy time period.

AFAA policy justifiably restricts infinite or lengthy research time periods. To do otherwise would stretch the information delivery date of significant problems to Air Force officials. Therefore, the task for QLW should be to provide audit managers with enough guidance and direction to successfully complete research within available time constraints. Yet, the consumption of program managers' time on other responsibilities provides no opportunity to develop specific research objectives. Consequently, the responsibility to identify weapon system problems rests almost exclusively with audit managers, while program managers accept, modify or reject the research input. While this approach produces audit reports, the efforts are not necessarily resource efficient nor do they always focus on weapon system problems considered most important by QLW supervisors.

Comparison of AFAA research techniques and policies to other audit organizations shows contrasting approaches to identifying weapon system problems. The AFAA policy calls for a single audit manager to evaluate a weapon system and identify significant problems within about 45 days. Other audit organizations allocate more resources to the research task. The Naval Audit Service, DOD IG, and GAO weapon system directorates each employ a team concept that runs up to 30 days. The research team, headed by GM-15s, 14s, and 13s also performs the application effort. The approach used by other audit organizations greatly increases their expertise base and ability to draw weapon system research conclusions. While the AFAA organizational structure does not provide QLW with an opportunity to form research teams, alternatives in staffing the research effort can offset the resource limitations.

RECOMMENDATION

QLW should consider restructuring research activities to provide a weapon system analysis prior to audit manager research tasking. The analysis should be of enough depth to establish specific research objectives, including:

- a research plan with scheduled completion dates
- the criteria required to establish the existence of a significant problem
- the functional areas of research responsibility within the weapon system
- an issues priority list

The comprehensive research plan could be developed from one of two sources. Program managers could perform initial research effort. Currently, program managers allocate about 20 percent of their effort to reviewing audit managers' research results. However, such a review does not provide audit managers with sufficient research direction. Most program manager research effort would occur prior to audit managers commencing research. This would allow program managers to maintain supervisory control over audit managers and also ensure the most important weapon system functional areas are reviewed and adequately evaluated. To offset any increased workload, administrative and report writing responsibilities should be transferred to audit managers.

As an alternative, an audit manager of senior experience could be used as a research specialist. This approach would require several management changes. One, each program manager would be required to deal directly with the research specialist to ensure each future weapon system audit focused on the desired functional activities and results. Otherwise, the research specialist would control the entire flow and direction of all QLW audits. Second, the research specialist must be evaluated separately from audit managers. The current personnel evaluation process closely aligns audit success with audit results, yet a research specialist would have no audit reports. Therefore, an alternate evaluation process for the research specialist would be necessary.

Weapon system audit research is a developing art that will continuously change and evolve in an effort to capture the greatest payoffs possible for the Air Force. The purpose of this analysis was to highlight potential methods and procedures that could further this growth process. As such, the critical evaluation should neither detract nor question the overall professionalism and dedication of the QLW supervisors and staff. Their earnest efforts to consistently produce high quality audit reports clearly demonstrates the present merits of QLW.

APPENDIX

SURVEY QUESTIONNAIRES

DEPARTMENT OF THE AIR FORCE
AIR COMMAND AND STAFF COLLEGE (AU)
MAXWELL AIR FORCE BASE, AL 36112

REPLY TO ATTN OF: Earl J. Scott
(c/o Maj. W. Furr/EDOWC)

SUBJECT: Questionnaire Package, AFAA Research Process

TO: Mr. Jackie R. Crawford (QLW)

1. The enclosed package contains nine audit manager and three program director questionnaires. These will hopefully form a baseline to compare audit manager experience levels with broad weapon system research responsibilities and also identify program manager research expectations. The questionnaires should take about 10 minutes to complete. In addition, each letter contains instructions and a voluntary participation statement.

2 Sorry, but I don't have any questions for you. Thanks for your support.

Earl J. Scott
Audit Manager at ACSC

Enclosures
12 Questionnaires

DEPARTMENT OF THE AIR FORCE
AIR COMMAND AND STAFF COLLEGE (AU)
MAXWELL AIR FORCE BASE, AL 36112

REPLY TO ATTN OF: Earl J. Scott
(c/o Maj. W. Furr/EDOWC)

SUBJECT: Questionnaire, AFAA Research Process

TO: QLW Program Manager

1. The purpose of the attached questionnaire is to acquire data in order to determine the adequacy of weapon system research activities. With your help, I hope to make some assessments on how we go about researching weapon systems and whether this process can be improved.

2. "Acquisition Management: A Guide For Program Management" (AFSCP 800-3) was used to develop the questionnaire. The questions generally cover the development, production and deployment stages on a weapon system. Your responses should reflect your opinion, attitudes and perceptions on whether QLW adequately and effectively accomplishes research in the specified areas within the normal 30 day research cycle.

3. You are requested to provide a response for each question. Of course, your participation in this research is voluntary.

4. This project has been approved by Mr. Crawford and is intended for QLW internal use only. Your responses to the questions will be held strictly confidential and I have also excluded demographic questions that could connect you with your response.

5. Please seal the completed questionnaire in the accompanying envelope and return mail it within 1 week after receipt.

Earl J. Scott

Earl J. Scott
ACSC Student

ATCH
1. Questionnaire
2. Return envelope

QUESTIONNAIRE

PART I. Please circle or provide your response as indicated.

1. How many hours a week do you work? _____

2. What percentage of your time is spent doing the following:
   a. Miscellaneous Administration ____%
   b. Out Year Planning ____%
   c. Audit Manager Review
      1) Research ____%
      2) Program Development ____%
      3) Application ____%
      4) Validation & Out brief ____%
   d. Rewriting Draft Reports ____%
   e. Your Own Research of Issues ____%
   f. Other (please specify) _____ ____%

3. How would you characterize the level of audit manager experience in the following areas:

	MARGINAL	ACCEPTABLE	EXCELLENT
Research	____	____	____
Program Development	____	____	____
Application	____	____	____
Valid/Out Brief	____	____	____
Writing	____	____	____

4. a. Do you believe the time allotted for audit manager research is sufficient? Yes / No

   b. If no, how much time is necessary? _____ days

5. What do you regard as the most critical factors used in assessing whether an audit is successful? (Note: if more than one, please apply a percentage weight.)

   a. Dollars Involved ____
   b. Quantity of Issues ____
   c. Creativity/Originality of Issues ____
   d. Meeting Milestones ____
   e. Other (please specify) _____

PART II. Please indicate the degree of audit coverage that should be provided in each on the issue areas shown below based on the following scale:

A. No research necessary
B. Rarely research
C. Occasional research
D. Should generally research
E. Always research

FUNCTIONAL AREA	RESEARCH COVERAGE (A thru E)
A. Program Control	____
1. Cost Estimating	____
2. Forecasting	____
3. Budgeting	____
4. Scheduling	____
5. Financial Planning	____
6. Financial Reporting	____
B. Procurement	
1. Acquisition Authority	____
2. Contract Type Selection	____
3. Acquisition Strategy Plan	____
4. Advanced Procurement Plan	____
5. Pre-award: The Source Selection Procedures	____
6. Negotiation Process	____
7. Contract Changes	____
8. Performance Measurement	____
9. Computer Hardware/Software Acquisition	____
C. Engineering	
1. Data Selection	____
2. Technical Planning & Reviews: System Design Review Preliminary Design Review Critical Design Review Functional Configuration Audit	____
3. Design/Development Integration	____
4. Decision Risk Analysis	____
5. Reliability	____

C. Engineering (cont.)
6. Maintainability & Maintenance Engineering
7. Electromagnetic Compatibility
8. Survivability/Vulnerability
9. Systems Safety
10. Laboratory Support:
Interface
Technology Needs

D. Configuration Management
1. Baseline Management:
Functional Baseline
Allocated Baseline
Production Baseline
2. Configuration Items
3. Interface Control
4. Product Specifications/ Requirements
5. Class I & II Changes
6. Configuration Control Board
7. Life Cycle Management

E. Test and Evaluation
1. Program Manager Responsibilities
2. AFTEC Responsibilities
3. User Responsibilities
4. Funding
5. Test Support Documentation
6. Test Results Assessment

F. Manufacturing and Production Management
1. Producibility
2. Production Planning:
Production Capability Estimate
Production Feasibility Assessment
Production Readiness Reviews
3. Manufacturing Technology
4. Industrial Preparedness Planning

G. Integrated Logistics Support
1. Planning Process
2. Program Management Responsibility Transfer

G. Integrated Logistics Support (cont.)
  3. Repair Capability:
     Optimum Repair Level
       Analysis (LRUs, SRUs, etc.)
     Spares Requirements (ISSL,
       WRSK, MSK, HPMSK, etc.)
     Facilities Planning

H. Interface Management
  1. Interface Control Working Group

I. Data Management
  1. Identification of Data Requirements
  2. Data Substantiation
  3. Types of Data
  4. Data Acquisition
  5. Reprocurement Data
  6. Scientific & Technical Information
  7. Computer Program Data Acquisition

J. Intelligence
  1. Intelligence Requirements
     Assessment
  2. Threat Impacts
  3. Approved Intelligence

K. Communications and Electronics
  1. Budgeting and Funding
  2. CCC

L. Deployment Management
  1. Criteria
  2. Activation Planning
  3. Initial Operational Capability
     Supportability

M. Contract Administration
  1. Mission & Interface with AFCMD
  2. Engineering:
     Quality Assurance
     Manufacturing Support
  3. Cost Reporting Analysis
  4. Subcontract Management
  5. Flight Operations & Related
     Surveillance
  6. Negotiations:
     Billings & Rates
     Cost Treatments
  7. Terminations

M. Contract Administration (cont.)
8. Prices & Agreements for Provisioning Items ____

N. Training (Weapon System Users)
1. Training Concepts ____
2. Training Requirements (Types) ____
3. Equipment Requirements ____
4. ATC Mission Support Requirements ____

I have no other questions. Your help is greatly appreciated. If you have any other comments on the audit research process, please feel free to write them down or give me a call. Thank you.

DEPARTMENT OF THE AIR FORCE
AIR COMMAND AND STAFF COLLEGE (AU)
MAXWELL AIR FORCE BASE, AL 36112

REPLY TO ATTN OF: Earl J. Scott
(c/o Maj. W. Furr/EDOWC)

SUBJECT: Questionnaire, AFAA Research Process

TO: QLW Audit Manager

1. The purpose of the attached questionnaire is to acquire data in order to compare QLW auditor experience with the areas of responsibility required for weapon system research. I believe research is the most important phase of an audit and has the most impact on your success as an audit manager. With your help, I hope to make some assessments on how we go about researching weapon systems and whether this process can be improved.

2. "Acquisition Management: A Guide For Program Management" (AFSCP 800-3) was used to develop the questionnaire. The questions generally cover the development, production and deployment stages on a weapon system. Your responses should reflect your opinion, attitudes and perceptions on whether you could adequately and effectively research the specified areas within the normal 30 day research cycle.

3. You are requested to provide a response for each question. Of course, your participation in this research is voluntary.

4. This project has been approved by Mr. Crawford and is intended for QLW internal use only. Your responses to the questions will be held strictly confidential and I have also excluded demographic questions that could connect you with your response.

5. Please seal the completed questionnaire in the accompanying envelope and return mail it within 1 week after receipt.

Earl J. Scott
Earl J. Scott
ACSC Student

ATCH
1. Instructions
2. Questionnaire
3. Return envelope

INSTRUCTIONS FOR ANSWERING QUESTIONNAIRE

PART I

Two responses are required for each question in Part I. Out of necessity, the areas noted are very broad and encompass many subfunctions.

a. The first response indicates your knowledge in a given area. Try to visualize the breadth of these areas and relate it to your experience. Indicate your knowledge based on the following scale:

1. None
2. A small amount
3. A moderate amount
4. A fairly large amount
5. A great amount

b. The second response indicates whether you would attempt to focus research effort on the given area if given the option of your choice. Your response should be based on what you would do in the normal 30 day research phase. Obviously, you could not research all the areas during any one project research phase, therefore treat each area independently. Indicate your response on the following scale:

A. Would not research
B. Would receive little attention
C. Would receive moderate attention
D. Would receive much attention
E. Would definitely research

PART II

Please circle your responses on the questionnaire.

QUESTIONNAIRE

PART I

FUNCTIONAL AREA	YOUR KNOWLEDGE OF AREA (1 thru 5)	YOUR RESEARCH ATTEMPT (A thru E)
A. Program Control		
1. Cost Estimating		
2. Forecasting		
3. Budgeting		
4. Scheduling		
5. Financial Planning		
6. Financial Reporting		
B. Procurement		
1. Acquisition Authority		
2. Contract Type Selection		
3. Acquisition Strategy Plan		
4. Advanced Procurement Plan		
5. Pre-award: The Source Selection Procedures		
6. Negotiation Process		
7. Contract Changes		
8. Performance Measurement		
9. Computer Hardware/Software Acquisition		
C. Engineering		
1. Data Selection		
2. Technical Planning & Reviews: System Design Review Preliminary Design Review Critical Design Review Functional Configuration Audit		
3. Design/Development Integration		
4. Decision Risk Analysis		
5. Reliability		
6. Maintainability & Maintenance Engineering		
7. Electromagnetic Compatibility		
8. Survivability/Vulnerability		
9. Systems Safety		
10. Laboratory Support: Interface Technology Needs		

D. Configuration Management

1. Baseline Management:
   - Functional Baseline
   - Allocated Baseline
   - Production Baseline
2. Configuration Items
3. Interface Control
4. Product Specifications/ Requirements
5. Class I & II Changes
6. Configuration Control Board
7. Life Cycle Management

E. Test and Evaluation

1. Program Manager Responsibilities
2. AFTEC Responsibilities
3. User Responsibilities
4. Funding
5. Test Support Documentation
6. Test Results Assessment

F. Manufacturing and Production Management

1. Producibility
2. Production Planning:
   - Production Capability Estimate
   - Production Feasibility Assessment
   - Production Readiness Reviews
3. Manufacturing Technology
4. Industrial Preparedness Planning

G. Integrated Logistics Support

1. Planning Process
2. Program Management Responsibility Transfer
3. Repair Capability:
   - Optimum Repair Level Analysis (LRUs, SRUs, etc.)
   - Spares Requirements (ISSL, WRSK, MSK, HPMSK, etc.)
   - Facilities Planning

H. Interface Management

1. Interface Control Working Group

I. Data Management
1. Identification of Data Requirements
2. Data Substantiation
3. Types of Data
4. Data Acquisition
5. Reprocurement Data
6. Scientific & Technical Information
7. Computer Program Data Acquisition

J. Intelligence
1. Intelligence Requirements Assessment
2. Threat Impacts
3. Approved Intelligence

K. Communications and Electronics
1. Budgeting and Funding
2. CCC

L. Deployment Management
1. Criteria
2. Activation Planning
3. Initial Operational Capability Supportability

M. Contract Administration
1. Mission & Interface with AFCMD
2. Engineering:
Quality Assurance
Manufacturing Support
3. Cost Reporting Analysis
4. Subcontract Management
5. Flight Operations & Related Surveillance
6. Negotiations:
Billings & Rates
Cost Treatments
7. Terminations
8. Prices & Agreements for Provisioning Items

N. Training (Weapon System Users)
1. Training Concepts
2. Training Requirements (Types)
3. Equipment Requirements
4. ATC Mission Support Requirements

PART II (Please circle your answer)

1. Upon assignment of your prior audits, to what extent were the research objectives defined?

a. The Weapon System only
b. The Weapon System and general areas of interest
c. The Weapon System and specific problems

2. Was the time allotted for research sufficient to identify the most critical Weapon System problems?

a. The time allotted was adequate
b. Additional time would have been beneficial
c. More time was necessary
d. More time was essential

3. Would you be willing to terminate an audit on the basis of no problems identified during research?

a. No
b. Not more than once
c. Not more than twice
d. However often as necessary

I have no other questions. Your help is greatly appreciated. If you have any other comments on the audit research process, please feel free to write them down or give me a call. Thank you.

DEPARTMENT OF THE AIR FORCE
AIR COMMAND AND STAFF COLLEGE (AU)
MAXWELL AIR FORCE BASE, AL 36112

REPLY TO ATTN OF: Earl J. Scott
(c/o Maj. W. Furr/EDOWC)

SUBJECT: Air Force Audit Agency Research Process

TO:

1. I would appreciate your help in attaining some information on your organization's audit process. I'm an audit manager with the Air Force Audit Agency (AFAA) currently attending Air Command and Staff College at Maxwell AFB. With the agreement of AFAA, while at the college I am conducting a study on the audit research process used by our agency to identify issues for indepth audit of aircraft and missile weapon systems. My purpose is to determine whether a more effective research approach is possible. As part of this study, I hope to compare the research process used by AFAA to the processes used by other agencies auditing DOD weapon systems.

2. To help you understand the type of information needed, I have enclosed the following: Attachment (1), a simplified AFAA organization chart and brief discription of how we perform our research effort; and Attachment (2), twelve questions to highlight the differences between our research processes and to get your opinion on how well your system works, i.e. strengths and weaknesses.

3. Your help in this project would be greatly appreciated and also provide very meaningful data. If you have any questions, I may be reached at (AUTO) 875-6794. Also, the AFAA Associate Director of Weapon System Audits, Mr. Jack Crawford (GM-15), is aware of this request and may be reached at (AUTO) 787-5433.

Earl J. Scott

Earl J. Scott
Audit Manager; Student ACSC

ATCH
1. AFAA Research Process
2. Questionnaire
3. Return envelope

QUESTIONNAIRE

1. a. Is there a directorate or division responsible for performing weapon system audits in your organization? Yes / No Please use the organization chart on Atch 1 to compare your organization structure.

b. If no, does your organization perform audits directed to review only functions within a single weapon system? Yes / No

2. a. What percentage of the weapon systems audits are initiated:

- Internally _____%
- Externally _____%

b. For internally generated audits, what process is used to identify weapon systems that will be audited?

_____

_____

3. How large is the audit manager/supervisor resource pool available for weapon system audits? _____

_____

4. How many weapon system audits are performed annually? ____

5. What is the average duration of weapon system audits?

_____ months

6. Is the research process a seperate identifiable phase of your audit process? Yes / No

7. a. Who performs the research in your organization?

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b. To what extent are issues or specific areas identified to the researcher? Also, who provides this information?

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8. a. Is there a standard period of time for accomplishing research, and if so, what is the standard?

Yes / No Standard Time: _____

b. Is the research standard usually met? Yes / No

9. a. Does the researcher also perform the audit? Yes / No

b. If not, what is the organizational relationship between the researcher and audit manager?

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10. a. What are the grade levels of researchers? _____

b. What are the grade levels of audit managers? _____

11. How would you characterize the weapon system experience level of your organization's weapon system researchers and audit managers?

	High	Moderate	Low
Researchers	____	____	____
Audit Managers	____	____	____

12. How does your organization insure that the most critical weapon system problems are identified for indepth audit effort?

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I have no other questions. Thank you very much for your cooperation. If you have any other comments or questions, please feel free to make them on the back of this form or call me.

APPENDIX

ANALYSIS DATA

Table 4

AUDIT MANAGER AND PROGRAM MANAGER
FUNCTIONAL AREA RECOGNITION

Key for Answers:

AM Knowledge - 1. None
2. A small amount
3. A moderate amount
4. A fairly large amount
5. A great amount

AM Attempt - 1. Would not research
2. Would receive little attention
3. Would receive moderate attention
4. Would receive much attention
5. Would definately research

PM Importance- 1. No research necessary
2. Rarely research
3. Occasional research
4. Should generally research
5. Always research

A. PROGRAM CONTROL

1. Cost Estimating									
AM Knowledge	2	2	2	2	2	4	2	3	3
AM Attempt	3	4	3	2	4	3	4	3	3
PM Importance	3	3	3						
2. Forecasting									
AM Knowledge	2	2	3	2	2	3	2	2	3
AM Attempt	2	4	3	2	4	2	1	2	3
PM Importance	2	2	3						
3. Budgeting									
AM Knowledge	3	2	5	2	2	4	2	4	3
AM Attempt	3	5	3	3	4	3	2	4	3
PM Importance	4	3	3						
4. Scheduling									
AM Knowledge	3	1	4	2	2	4	4	3	4
AM Attempt	3	3	4	2	4	3	4	3	4
PM Importance	2	2	3						
5. Financial Planning									
AM Knowledge	4	2	4	2	2	4	3	3	4
AM Attempt	3	5	4	2	4	2	2	4	3
PM Importance	4	2	4						

Table 4 (Cont.)

A. PROGRAM CONTROL (Cont.)

6. Financial Reporting									
AM Knowledge	5	2	4	2	2	4	5	4	4
AM Attempt	3	5	5	2	4	3	5	4	1
PM Importance	3	5	4						

B. PROCUREMENT

7. Acquisition Authority									
AM Knowledge	4	3	3	2	2	4	3	2	4
AM Attempt	3	3	2	1	3	3	3	1	3
PM Importance	2	2	2						
8. Contract Type Selection									
AM Knowledge	4	3	3	3	2	4	3	3	4
AM Attempt	3	4	2	1	3	2	2	3	4
PM Importance	3	2	3						
9. Acquisition Strategy Plan									
AM Knowledge	4	2	4	2	4	4	5	2	4
AM Attempt	3	5	3	2	3	5	5	2	4
PM Importance	4	4	5						
10. Advanced Procurement Plan									
AM Knowledge	3	2	3	2	1	1	2	2	4
AM Attempt	2	5	2	2	1	1	2	2	4
PM Importance	3	2	4						
11. Pre-award: The Source Selection Procedures									
AM Knowledge	3	2	3	2	2	3	4	2	4
AM Attempt	2	4	2	1	1	1	3	2	3
PM Importance	3	2	3						
12. Negotiation Process									
AM Knowledge	4	3	3	2	2	3	3	3	4
AM Attempt	3	4	4	1	2	2	2	3	2
PM Importance	3	4	3						
13. Contract Changes									
AM Knowledge	4	2	3	3	4	4	4	4	4
AM Attempt	3	5	5	5	3	5	4	4	4
PM Importance	4	5	4						
14. Performance Measurement									
AM Knowledge	5	2	4	2	3	4	5	4	5
AM Attempt	3	5	5	3	4	5	5	4	4
PM Importance	3	2	4						
15. Computer Hardware/Software Acquisition									
AM Knowledge	2	2	3	1	1	4	2	1	3
AM Attempt	2	4	5	2	2	5	2	1	3
PM Importance	2	5	5						

Table 4 (Cont.)

C. ENGINEERING

16. Data Selection									
AM Knowledge	2	2	3	2	1	4	3	1	3
AM Attempt	3	4	2	2	1	3	1	1	2
PM Importance	3	4	3						
17. Technical Planning & Reviews: System Design Review Preliminary Design Review Critical Design Review Functional Configuration Audit									
AM Knowledge	2	2	3	3	2	4	4	1	4
AM Attempt	3	3	2	3	2	5	3	1	4
PM Importance	3	2	4						
18. Design/Development Integration									
AM Knowledge	2	2	3	2	1	4	3	1	3
AM Attempt	3	4	3	1	3	5	2	1	4
PM Importance	3	2	3						
19. Decision Risk Analysis									
AM Knowledge	2	2	2	1	1	3	2	1	3
AM Attempt	2	4	1	1	3	3	3	1	4
PM Importance	3	2	3						
20. Reliability									
AM Knowledge	3	3	4	1	1	2	2	2	3
AM Attempt	3	5	3	3	3	4	3	3	3
PM Importance	4	4	4						
21. Maintainability & Maintenance Engineering									
AM Knowledge	3	2	4	1	1	3	3	2	3
AM Attempt	3	4	4	3	3	4	4	3	3
PM Importance	4	4	3						
22. Electromagnetic Compatibility									
AM Knowledge	1	1	3	1	1	4	3	1	3
AM Attempt	2	2	2	1	1	3	2	1	3
PM Importance	3	5	2						
23. Survivability/Vulnerability									
AM Knowledge	2	2	3	1	1	5	5	1	3
AM Attempt	3	3	2	3	4	5	5	1	4
PM Importance	4	5	3						
24. Systems Safety									
AM Knowledge	2	1	3	1	1	2	3	1	2
AM Attempt	2	2	1	1	1	2	1	1	1
PM Importance	1	2	2						

Table 4 (Cont.)

C. ENGINEERING (Cont.)

25. Laboratory Support: Interface Technology Needs									
AM Knowledge	1	2	2	1	1	2	2	2	2
AM Attempt	2	2	1	1	2	2	2	2	2
PM Importance	2	2	3						

D. CONFIGURATION MANAGEMENT

26. Baseline Management: Functional Baseline Allocated Baseline Production Baseline									
AM Knowledge	4	2	3	4	1	3	2	1	3
AM Attempt	3	4	3	5	3	3	2	1	3
PM Importance	2	2	3						
27. Configuration Items									
AM Knowledge	3	2	3	4	1	3	3	3	3
AM Attempt	2	4	4	5	2	2	3	2	4
PM Importance	3	5	3						
28. Interface Control									
AM Knowledge	2	2	3	3	1	4	3	3	3
AM Attempt	2	5	1	3	4	4	2	3	4
PM Importance	3	2	3						
29. Product Specifications/Requirements									
AM Knowledge	3	2	3	2	2	2	3	2	4
AM Attempt	3	4	1	2	3	2	5	2	4
PM Importance	4	4	3						
30. Class I & II Changes									
AM Knowledge	3	2	3	4	1	1	4	3	4
AM Attempt	3	4	1	5	3	1	5	3	2
PM Importance	3	5	3						
31. Configuration Control Board									
AM Knowledge	4	2	3	4	2	4	4	3	4
AM Attempt	2	4	1	5	3	3	2	2	2
PM Importance	3	4	3						
32. Life Cycle Management									
AM Knowledge	3	2	3	2	2	5	3	2	3
AM Attempt	3	4	1	3	3	4	2	2	2
PM Importance	2	5	4						

E. TEST AND EVALUATION

33. Program Manager Responsibilities									
AM Knowledge	2	2	3	3	2	2	4	2	3
AM Attempt	2	5	1	2	3	2	5	2	2
PM Importance	3	4	4						

Table 4 (Cont.)

E. TEST AND EVALUATION (Cont.)

34. AFTEC Responsibilities									
AM Knowledge	2	2	3	2	3	3	5	2	3
AM Attempt	2	4	2	2	3	3	3	2	2
PM Importance	3	4	4						
35. User Responsibilities									
AM Knowledge	2	2	3	2	1	3	5	1	3
AM Attempt	2	4	2	2	2	2	3	1	2
PM Importance	2	4	4						
36. Funding									
AM Knowledge	2	3	4	2	2	2	3	3	3
AM Attempt	2	4	1	2	2	1	2	3	3
PM Importance	3	1	3						
37. Test Support Documentation									
AM Knowledge	2	2	2	2	2	3	4	2	3
AM Attempt	2	5	1	2	4	1	3	3	3
PM Importance	2	5	5						
38. Test Results Assessment									
AM Knowledge	2	2	2	2	1	2	4	2	4
AM Attempt	2	5	1	3	4	2	5	3	3
PM Importance	4	5	5						

F. MANUFACTURING AND PRODUCTION MANAGEMENT

39. Producibility									
AM Knowledge	2	2	3	1	1	2	2	1	3
AM Attempt	2	5	1	1	4	4	1	1	3
PM Importance	3	2	4						
40. Production Planning:									
Production Capability Estimate									
Production Feasibility Assessment									
Production Readiness Reviews									
AM Knowledge	2	2	3	2	1	2	2	2	3
AM Attempt	2	4	1	3	3	4	3	2	4
PM Importance	3	2	5						
41. Manufacturing Technology									
AM Knowledge	2	2	3	1	2	2	2	2	2
AM Attempt	2	4	2	1	3	1	2	2	2
PM Importance	2	4	2						
42. Industrial Preparedness Planning									
AM Knowledge	2	1	3	1	1	1	2	1	2
AM Attempt	2	4	1	1	3	1	2	2	2
PM Importance	3	2	3						

Table 4 (Cont.)

G. INTEGRATED LOGISTICS SUPPORT

43. Planning Process									
AM Knowledge	3	2	4	2	3	4	4	4	3
AM Attempt	3	5	3	2	4	5	3	4	4
PM Importance	3	4	5						
44. Program Management Responsibility Transfer									
AM Knowledge	3	2	3	3	1	4	3	3	4
AM Attempt	2	4	1	3	4	3	3	4	3
PM Importance	3	2	3						
45. Repair Capability: Optimum Repair Level Analysis (LRUs, SRUs, etc.) Spares Requirements (ISSL, WRSK, MSK, HPMSK, etc.) Facilities Planning									
AM Knowledge	4	2	4	3	2	3	3	3	3
AM Attempt	3	4	4	4	4	4	5	4	4
PM Importance	4	5	4						

H. INTERFACE MANAGEMENT

46. Interface Control Working Group									
AM Knowledge	2	1	3	1	1	4	3	2	3
AM Attempt	2	5	1	1	1	4	2	1	2
PM Importance	3	1	3						

I. DATA MANAGEMENT

47. Identification of Data Requirements									
AM Knowledge	3	2	3	3	4	3	3	3	4
AM Attempt	3	5	1	3	2	5	2	3	4
PM Importance	3	2	3						
48. Data Substantiation									
AM Knowledge	3	1	2	2	2	2	2	3	4
AM Attempt	2	5	1	3	1	1	3	3	3
PM Importance	3	2	2						
49. Types of Data									
AM Knowledge	3	2	3	2	2	2	4	2	4
AM Attempt	2	5	1	2	2	2	2	2	3
PM Importance	3	2	2						
50. Data Acquisition									
AM Knowledge	3	2	3	2	3	4	4	2	4
AM Attempt	3	5	1	2	2	4	5	2	3
PM Importance	3	4	3						
51. Reprocurement Data									
AM Knowledge	3	2	3	3	2	4	3	3	3
AM Attempt	3	5	2	3	2	5	3	3	3
PM Importance	3	4	3						

Table 4 (Cont.)

I. DATA MANAGEMENT (Cont.)

52. Scientific & Technical Information									
AM Knowledge	3	1	3	2	2	4	1	2	3
AM Attempt	2	4	1	2	1	2	1	2	3
PM Importance	2	2	3						
53. Computer Program Data Acquisition									
AM Knowledge	3	1	3	1	1	4	1	1	4
AM Attempt	3	5	3	2	2	4	1	1	3
PM Importance	3	5	3						

J. INTELLIGENCE

54. Intelligence Requirements Assessment									
AM Knowledge	1	1	3	1	2	5	5	1	2
AM Attempt	2	5	1	1	3	4	5	1	1
PM Importance	4	2	3						
55. Threat Impacts									
AM Knowledge	1	1	3	1	1	5	5	1	2
AM Attempt	2	5	1	1	3	3	5	1	1
PM Importance	3	2	5						
56. Approved Intelligence									
AM Knowledge	1	1	3	1	1	5	4	1	2
AM Attempt	2	5	1	1	3	3	2	1	1
PM Importance	3	2	3						

K. COMMUNICATIONS & ELECTRONICS

57. Budgeting & Funding									
AM Knowledge	1	1	3	2	1	4	3	1	2
AM Attempt	2	3	1	2	1	2	3	2	1
PM Importance	3	2	5						
58. CCC									
AM Knowledge	1	1	3	2	1	3	3	1	2
AM Attempt	2	4	2	2	1	2	3	2	1
PM Importance	3	2	4						

L. DEPLOYMENT MANAGEMENT

59. Criteria									
AM Knowledge	2	1	2	1	1	2	5	3	2
AM Attempt	3	4	1	2	4	4	3	3	2
PM Importance	4	4	1						
60. Activation Planning									
AM Knowledge	2	1	3	1	1	2	4	3	3
AM Attempt	3	5	2	3	4	4	3	3	2
PM Importance	4	4	1						

Table 4 (Cont.)

L. DEPLOYMENT MANAGEMENT (Cont.)

61. Initial Operational Capability Supportability									
AM Knowledge	3	2	3	1	2	3	4	3	3
AM Attempt	3	5	1	3	4	4	4	3	3
PM Importance	4	5	5						
M. CONTRACT ADMINISTRATION									
62. Mission & Interface with AFCMD									
AM Knowledge	3	2	4	2	2	2	3	2	4
AM Attempt	2	2	1	1	2	1	1	2	5
PM Importance	2	2	3						
63. Engineering: Quality Assurance Manufacturing Support									
AM Knowledge	3	1	3	2	2	3	3	1	2
AM Attempt	3	3	1	2	3	4	2	1	3
PM Importance	3	2	5						
64. Cost Reporting Analysis									
AM Knowledge	3	2	4	1	2	4	5	3	5
AM Attempt	3	5	4	3	3	4	5	4	4
PM Importance	3	4	5						
65. Subcontract Management									
AM Knowledge	2	2	4	1	2	3	3	2	2
AM Attempt	3	5	4	2	3	4	3	3	3
PM Importance	3	4	3						
66. Flight Operations & Related Surveillance									
AM Knowledge	2	1	3	1	2	2	4	1	2
AM Attempt	2	3	1	1	3	2	4	1	2
PM Importance	2	2	1						
67. Negotiations: Billings & Rates Cost Treatments									
AM Knowledge	3	2	3	1	1	3	2	3	4
AM Attempt	3	4	2	2	3	3	2	4	5
PM Importance	4	5	4						
68. Terminations									
AM Knowledge	3	2	3	1	2	3	2	2	3
AM Attempt	2	4	1	1	3	2	4	1	2
PM Importance	3	2	3						
69. Prices & Agreements for Provisioning Items									
AM Knowledge	3	3	3	2	2	3	3	1	5
AM Attempt	3	5	1	3	3	4	3	3	5
PM Importance	4	5	4						

Table 4 (Cont.)

N. TRAINING (WEAPON SYSTEM USERS)

70. Training Concepts									
AM Knowledge	1	1	4	1	1	2	5	1	3
AM Attempt	2	2	1	1	3	2	5	3	3
PM Importance	2	4	4						
71. Training Requirements (Types)									
AM Knowledge	1	1	4	1	1	2	5	1	3
AM Attempt	2	2	1	2	3	2	5	2	3
PM Importance	3	5	4						
72. Equipment Requirements									
AM Knowledge	1	1	4	1	1	2	5	1	3
AM Attempt	2	2	1	2	3	2	4	3	3
PM Importance	3	5	4						
73. ATC Mission Support Requirements									
AM Knowledge	1	1	4	1	1	2	5	1	3
AM Attempt	2	2	1	2	3	2	3	2	3
PM Importance	3	4	4						

Table 5

SUMMARY OF AVERAGES
AUDIT MANAGER AND PROGRAM MANAGER
FUNCTIONAL AREA RECOGNITION

	AM KNOWLEDGE	AM ATTEMPT	PM IMPORTANCE
GROUP AVERAGES	2.5	2.8	3.2
INDIVIDUAL AVERAGES:			
Person 1	2.5	2.5	3.0
Person 2	1.8	4.1	3.2
Person 3	3.2	2.0	3.4
Person 4	1.8	2.2	
Person 5	1.7	2.8	
Person 6	3.1	3.0	
Person 7	3.3	3.0	
Person 8	2.1	2.3	
Person 9	3.2	2.9	
FUNCTIONAL AREA AVERAGES:			
A. PROGRAM CONTROL	2.9	3.2	3.0
1. Cost Estimating	2.4	3.2	3.0
2. Forecasting	2.3	2.6	2.3
3. Budgeting	3.0	3.3	3.3
4. Scheduling	3.0	3.2	2.3
5. Financial Planning	3.1	3.2	3.3
6. Financial Reporting	3.6	3.6	4.0
B. PROCUREMENT	3.0	3.0	3.3
1. Acquisition Authority	3.0	2.4	2.0
2. Contract Type Selection	3.2	2.7	2.7
3. Acquisition Strategy Plan	3.4	3.6	4.3
4. Advanced Procurement Plan	2.2	2.3	3.0
5. Pre-award: The Source Selection Procedures	2.8	2.1	2.7
6. Negotiation Process	3.0	2.6	3.3
7. Contract Changes	3.6	4.2	4.3
8. Performance Measurement	3.8	4.2	3.0
9. Computer Hardware/Software Acquisition	2.1	2.9	4.0

Table 5 (Cont.)

	AM KNOWLEDGE	AM ATTEMPT	PM IMPORTANCE
C. ENGINEERING	2.2	2.5	3.1
1. Data Selection	2.3	2.1	3.3
2. Technical Planning & Reviews	2.8	2.9	3.0
System Design Review			
Preliminary Design Review			
Critical Design Review			
Functional Configuration Audit			
3. Design/Development Integration	2.3	2.9	2.7
4. Decision Risk Analysis	1.9	2.4	2.7
5. Reliability	2.3	3.3	4.0
6. Maintainability & Maintenance Engineering	2.4	3.4	3.7
7. Electromagnetic Compatibility	2.0	1.9	3.3
8. Survivability/Vulnerability	2.6	3.3	4.0
9. Systems Safety	1.8	1.3	1.7
10. Laboratory Support	1.7	1.8	2.3
Interface			
Technology Needs			
D. CONFIGURATION MANAGEMENT	2.8	2.9	3.3
1. Baseline Management	2.6	3.0	2.3
Functional Baseline			
Allocated Baseline			
Production Baseline			
2. Configuration Items	2.8	3.1	3.7
3. Interface Control	2.7	3.1	2.7
4. Product Specifications/ Requirements	2.6	2.9	3.7
5. Class I & II Changes	2.8	3.0	3.7
6. Configuration Control Board	3.3	2.7	3.3
7. Life Cycle Management	2.8	2.7	3.7
E. TEST AND EVALUATION	2.5	2.6	3.1
1. Program Manager Responsibilities	2.4	2.7	3.7
2. AFTEC Responsibilities	2.7	2.6	3.7
3. User Responsibilities	2.4	2.2	3.3
4. Funding	2.7	2.2	2.3
5. Test Support Documentation	2.4	2.7	4.0
6. Test Results Assessment	2.3	3.1	4.7

Table 5 (Cont.)

	AM KNOWLEDGE	AM ATTEMPT	PM IMPORTANCE
F. MANUFACTURING AND PRODUCTION MANAGEMENT	1.9	2.4	2.9
1. Producibility	1.9	2.4	3.0
2. Production Planning	2.1	2.9	3.3
Production Capability Estimate			
Production Feasibility Assessment			
Production Readiness Reviews			
3. Manufacturing Technology	2.0	2.1	2.7
4. Industrial Preparedness Planning	1.6	2.0	2.7
G. INTEGRATED LOGISTICS SUPPORT	3.0	3.6	3.7
1. Planning Process	3.2	3.7	4.0
2. Program Management Responsibility Transfer	2.9	3.0	2.7
3. Repair Capability	3.0	4.0	4.3
Optimum Repair Level Analysis (LRUs, SRUs, etc.)			
Spares Requirements (ISSC, WPSC, MSK, HPMSK, etc.)			
Facilities Planning			
H. INTERFACE MANAGEMENT			
1. Interface Control Working Group	2.2	2.1	2.3
I. DATA MANAGEMENT	2.6	2.7	2.9
1. Identification of Data Requirements	3.1	3.1	2.7
2. Data Substantiation	2.3	2.4	2.3
3. Types of Data	2.7	2.3	2.3
4. Data Acquisition	3.0	3.0	3.3
5. Reprocurement Data	2.9	3.2	3.3
6. Scientific & Technical Information	2.3	2.0	2.3
7. Computer Program Data Acquisition	2.1	2.7	4.0
J. INTELLIGENCE	2.2	2.4	3.0
1. Intelligence Requirements Assessment	2.3	2.6	3.0
2. Threat Impacts	2.2	2.4	3.3
3. Approved Intelligence	2.1	2.1	2.7

Table 5 (Cont.)

	AM KNOWLEDGE	AM ATTEMPT	PM IMPORTANCE
K. COMMUNICATIONS AND ELECTRONICS	1.9	2.0	3.2
1. Budgeting and Funding	2.0	1.9	3.3
2. CCC	1.9	2.1	3.0
L. DEPLOYMENT MANAGEMENT	2.3	3.1	3.6
1. Criteria	2.1	2.9	3.0
2. Activation Planning	2.2	3.2	3.0
3. Initial Operational Capability Supportability	2.7	3.3	4.7
M. CONTRACT ADMINISTRATION	2.5	2.8	3.2
1. Mission & Interface with AFCMD	2.7	1.9	2.3
2. Engineering Quality Assurance Manufacturing Support	2.2	2.4	3.3
3. Cost Reporting Analysis	3.2	3.9	4.0
4. Subcontract Management	2.3	3.3	3.3
5. Flight Operations & Related Surveillance	2.0	2.1	1.6
6. Negotiations Billings & Rates Cost Treatments	2.4	3.1	4.3
7. Terminations	2.3	2.2	2.7
8. Prices & Agreements for Provisioning Items	2.8	3.3	4.3
N. TRAINING (WEAPON SYSTEM USERS)	2.1	2.4	3.7
1. Training Concepts	2.1	2.4	3.3
2. Training Requirements (Types)	2.1	2.4	4.0
3. Equipment Requirements	2.1	2.4	4.0
4. ATC Mission Support Requirements	2.1	2.2	3.7

Table 6

AVERAGE COMPARISON OF PM IMPORTANCE
TO AM KNOWLEDGE AND ATTEMPT

PM IMPORTANCE			AM KNOWLEDGE		AM ATTEMPT		# AM
AVG.	ITEM		AVG.	#SCORING 1 or 2	AVG.	#SCORING 1 or 2	SCORING 1 or 2
4.7	38	Test & Eval.	2.3	7	3.1	3	7
4.7	61	Deploy. Mgt.	2.2	3	3.3	1	3
4.0	37	Test & Eval.	2.4	6	2.7	4	7
4.0	71	Training	2.1	6	2.4	6	7
4.0	72	Training	2.1	6	2.4	5	7
4.0	23	Engineering	2.6	5	3.3	2	6
4.0	15	Procurement	2.1	6	2.9	5	6
4.0	20	Engineering	2.3	5	3.3	-	5
4.0	53	Data Mgt.	2.1	5	2.7	4	5
4.3	67	Contract Adm.	2.4	4	3.1	3	5
4.0	6	Program Control	3.6	3	3.6	2	4
4.3	69	Contract Adm.	2.8	3	3.3	1	4
4.3	9	Procurement	3.4	3	3.6	2	3
4.0	64	Contract Adm.	3.2	3	3.9	-	3
4.0	43	Logistics	2.2	2	3.7	1	2
4.3	45	Logistics	3.0	2	4.0	-	2
4.3	13	Procurement	3.6	1	4.2	-	1
3.7	33	Test & Eval.	2.4	6	2.7	6	6
3.7	32	Config. Mgt.	2.8	4	2.7	4	7
3.7	73	Training	2.1	6	2.2	6	7
3.6	29	Config. Mgt.	2.6	5	2.9	4	6
3.7	34	Test & Eval.	2.8	4	3.5	5	6
3.7	27	Config. Mgt.	2.8	2	3.1	4	5
3.6	30	Config. Mgt.	2.8	3	3.0	3	5
3.7	21	Engineering	2.4	4	3.4	-	4
3.0	10	Procurement	2.2	6	2.3	7	8
3.3	16	Engineering	2.3	5	2.1	6	8
3.3	35	Test & Eval.	2.4	5	2.2	7	8
3.0	39	Mfg. & Prod.	1.9	7	2.4	5	8
3.3	40	Mfg. & Prod.	2.1	7	2.9	3	8
3.3	57	Comm. & Elect.	2.0	6	1.9	7	8
3.0	58	Comm. & Elect.	1.9	6	2.1	7	8
3.3	31	Config. Mgt.	3.3	2	2.7	5	7
3.3	22	Engineering	2.0	5	1.8	7	7
3.0	54	Intelligence	2.3	6	2.6	5	7
3.3	55	Intelligence	2.2	6	2.4	5	7
3.0	59	Deploy. Mgt.	2.1	7	2.9	3	7

Table 6 (Cont.)

PM IMPORTANCE AVG.	ITEM		AM KNOWLEDGE AVG.	AM KNOWLEDGE #SCORING 1 or 2	AM ATTEMPT AVG.	AM ATTEMPT #SCORING 1 or 2	# AM SCORING 1 or 2
3.0	60	Deploy. Mgt.	2.2	5	3.0	2	7
3.3	63	Contract Adm.	2.2	5	2.4	4	7
3.3	70	Training	2.1	6	2.4	5	7
3.0	1	Program Control	2.4	6	3.2	1	6
3.3	65	Contract Adm.	2.3	6	3.3	1	6
3.3	5	Program Control	3.1	3	3.2	3	5
3.3	12	Procurement	3.0	2	2.6	5	5
3.0	17	Engineering	2.8	4	2.9	3	5
3.3	50	Data Mgt.	3.0	3	3.0	4	5
3.3	51	Data Mgt.	2.9	2	3.2	2	3
3.0	3	Program Control	3.0	4	3.3	1	4
3.0	14	Procurement	3.8	2	4.2	-	2
2.7	41	Mfg. & Prod.	2.0	8	2.1	7	9
2.7	42	Mfg. & Prod.	1.5	8	2.0	7	9
2.7	68	Contract Adm.	2.3	5	2.2	6	9
2.7	56	Intelligence	2.1	6	2.1	6	8
2.7	11	Procurement	2.8	4	2.1	6	7
2.7	19	Engineering	1.9	7	2.4	4	7
2.7	18	Engineering	2.3	5	2.9	3	6
2.7	8	Procurement	3.2	1	2.6	4	5
2.7	28	Config. Mgt.	2.7	3	3.1	2	5
2.7	44	Logistics	2.9	2	3.0	2	4
2.7	47	Data Mgt.	3.1	1	3.1	3	4
2.3	25	Engineering	1.6	9	1.8	9	9
2.3	46	Interface Mgt.	2.2	5	2.1	7	8
2.3	49	Data Mgt.	2.7	5	2.3	7	8
2.3	52	Data Mgt.	2.3	5	2.0	7	8
2.3	62	Contract Adm.	2.7	5	1.9	8	8
2.3	2	Program Control	2.3	6	2.6	5	7
2.3	48	Data Mgt.	2.3	6	2.4	4	7
2.3	36	Test & Eval.	2.7	4	2.2	6	6
2.0	7	Procurement	3.0	3	2.4	3	4
2.3	26	Config. Mgt.	2.6	4	3.0	2	4
2.3	4	Program Control	3.0	3	3.3	1	3
1.7	24	Engineering	1.8	7	1.3	9	9
1.7	66	Contract Adm.	2.0	7	2.1	6	8

Table 7

AVERAGE COMPARISON OF AM ATTEMPT
TO PM IMPORTANCE AND AM KNOWLEDGE

AVERAGE AM ATTEMPT AVG.	ITEM		AVERAGE PM IMPORTANCE	AVERAGE AM KNOWLEDGE	AM ATTEMPT LESS KNOWLEDGE
AM AVERAGE ATTEMPT 4.0+					
4.2	13	Procurement	4.3	3.5	.7
4.2	14	Procurement	3.0	3.7	.5
4.0	45	Logistics	4.3	3.0	1.0
AM AVERAGE ATTEMPT 3.5 - 3.99					
3.6	6	Program Cont.	4.0	3.6	-
3.6	9	Procurement	4.3	3.4	.2
3.7	43	Logistics	4.0	3.2	.5
3.9	64	Contract Adm.	4.0	3.2	.7
AM AVERAGE ATTEMPT 3.0 - 3.49					
3.2	1	Program Cont.	3.0	2.4	.8
3.3	3	Program Cont.	3.3	3.0	.3
3.3	4	Program Cont.	2.3	3.0	.3
3.2	5	Program Cont.	3.3	3.1	.1
3.3	20	Engineering	4.0	2.3	1.0
3.4	21	Engineering	3.6	2.4	1.0
3.3	23	Engineering	4.0	2.5	.8
3.0	26	Config. Mgt.	2.3	2.6	.4
3.1	27	Config. Mgt.	3.7	2.8	.3
3.1	28	Config. Mgt.	2.7	2.7	.4
3.0	30	Config. Mgt.	3.7	2.8	.2
3.1	38	Test & Eval.	4.7	2.3	.8
3.0	44	Logistics	2.7	2.9	.1
3.1	47	Data Mgt.	2.7	3.1	-
3.2	51	Data Mgt.	3.3	2.9	.3
3.2	60	Deploy. Mgt.	3.0	2.2	1.0
3.3	61	Deploy. Mgt.	4.7	2.7	.6
3.3	65	Contract Adm.	3.3	2.3	1.0
3.1	67	Contract Adm.	4.3	2.4	.7
3.3	69	Contract Adm.	4.3	2.7	.6

Table 8

AVERAGE COMPARISON OF AM KNOWLEDGE
TO PM IMPORTANCE AND AM ATTEMPT

ITEM		AVG. AM KNOWLEDGE	AVG. PM IMPORTANCE	AVG. AM ATTEMPT
AM AVG. KNOWLEDGE 3.5 - 3.99				
6.	Financial Reporting	3.6	4.0	3.6
13.	Contract Changes	3.6	4.3	4.2
14.	Performance Measurement	3.8	3.0	4.2
AM AVG. KNOWLEDGE 3.0 - 3.49				
3.	Budgeting	3.0	3.3	3.3
4.	Scheduling	3.0	3.3	3.2
5.	Financial Planning	3.1	3.3	3.2
7.	Acquisition Authority	3.0	2.0	2.4
8.	Contract Type Selection	3.2	2.7	2.7
9.	Acquisition Strategy Plan	3.4	4.3	3.6
12.	Negotiation Process	3.0	3.3	2.6
31.	Configuration Control Board	3.3	3.3	2.7
43.	Planning Process	3.2	4.0	3.7
45.	Repair Capability	3.0	4.3	4.0
47.	Ident. of Data Requirements	3.1	2.7	3.1
50.	Data Acquisition	3.0	3.3	3.0
64.	Cost Reporting Analysis	3.2	4.0	3.9

Table 9

SUMMARY OF FUNCTIONAL
AREA AVERAGES

FUNCTIONAL AREA	AM KNOWLEDGE	AM ATTEMPT	PM IMPORTANCE
G. Integrated Logistics Support	3.0	3.6	3.7
N. Training (Weapon System Users)	2.1	2.4	3.7
L. Deployment Management	2.3	3.1	3.6
B. Procurement	3.0	3.0	3.3
D. Configuration Management	2.8	2.9	3.3
K. Communications & Electronics	1.9	2.0	3.2
M. Contract Administration	2.5	2.8	3.2
A. Program Control	2.9	3.2	3.1
C. Engineering	2.2	2.5	3.1
E. Test & Evaluation	2.5	2.6	3.1
J. Intelligence	2.2	2.4	3.0
F. Manufacturing & Production	1.9	2.4	2.9
I. Data Management	2.6	2.7	2.9
H. Interface Management	2.2	2.1	2.3

Table 10

AM QUESTIONNAIRE

AM QUESTIONS	1	2	3	4	5	6	7	8	9	TOTAL
1. Extent of Research obj. defined										
a. WS only			x	x				x		3
b. WS & General Areas	x				x	x	x		x	5
c. WS & Specific Problems		x								1
2. Was Research Time Adequate										
a. Yes	x						x	x		3
b. More - Beneficial		x		x	x	x				4
c. More - Necessary			x						x	2
d. More - Essential										0
3. Willingness to Terminate Audit During Research										
a. No										0
b. Not More than Once		x	x		x			x		4
c. Not More than Twice										0
d. As Necessary	x			x		x	x		x	5

Table 11

PM QUESTIONNAIRE

QUESTIONS	PM 1	PM 2	PM 3	AVG
1. Weekly Hours Worked	45	50	45	46.6
2. Time Allotment				
Misc. Admin.	25%	15%	20%	20 %
Out Yr. Planning	5%	5%	5%	5 %
AM Review				
Research	35%	5%	20%	20 %
Prog. Dev.	7%	5%	5%	5.6%
Application	4%	10%	25%	13 %
Val. & Out Brief	10%	15%	5%	10 %
Rewrite Reports	14%	45%	15%	24.6%
Indep. Research	-0-	-0-	5%	1.6%
Other	-0-	-0-	-0-	-0-
3. Audit Mgt. Experience (Overall Ability) Marg.=1, Accept.=3, Excel.=5				
Research	3	1	1	1.6
Prog. Dev.	5	3	1	3.0
Application	5	3	3	3.6
Valid/Out Brief	3	3	1	2.3
Writing	3	1	1	1.6
	19	11	7	12.1
Totals Div. by 5 = Avg.	3.8	2.2	1.4	2.4
4. Research Time Reg'd. Days	120	90	30	80
5. Critical Audit Success Factors				
Dollars Involved		10%		3.3%
Qty. of Issues	50%	10%		20.0%
Creat./Orig. of Issues		30%	75%	35.0%
Milestones	50%	50%		33.3%
Other (Affectiveness)			25%	8.3%

Table 12

OTHER AUDIT AGENCIES
QUESTIONNAIRE

External Audit Agencies - WS Audit Mgt.

	GAO	DODIG	NAVY	ARMY
1.a. Is there a WS Directorate	Yes[1]	Yes	Yes	No
2.a. WS audit initiation Internally	Unknown	.80	.90	-
Externally		.20	.10	-
b. Selection Proc.	GM-15	PD(15) research		
3. AM/Supervisor force size	Large	8	8	-
4. # WS annually performed	Downswing	16	6 - 7	-
5. Avg. time frame for WS audit	No std.	6 mos.[2]	3 mos.	
6. Is research separate phase	Yes	Yes	Yes	
7.a. Who performs research	Entire Staff	PD(15)	AIC/ Journeymen	
b. Degree of issues identified	Self-Gen.	OSD Staff Sug.	Self-Gen.	
8.a. Research time frame	No std.	30 days	2 wks.	
b. Is time frame met	-	Yes	Yes	
9.a. Do researchers perform audit	Usually w/staff	Yes w/staff	Yes Supervisors[3]	
10.a. Researchers GS level	14/7	15	13/12	
b. AM GS	13/14	14	13	
11. Experience levels Researchers	High	Moderate	Moderate	
AMs	High	Moderate	Moderate	

[1]Reorganize '83 cross cut groups of WS or mission area.
[2]Excludes 3 months for final report.
[3](12/13) with 1 or 2 assistants (5/12).

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