AD-A016 264

ACQUISITION PRODUCTION MANAGEMENT TASKS: A PROGRAM OFFICE/AFPRO COMPARISON OF RELATIVE TASK SIZE AND PRIORITY

William K. Goss, et al

Air Force Institute of Technology
Wright-Patterson Air Force Base, Ohio

August 1975

ACQUISITION PRODUCTION MANAGEMENT TASKS: A PROGRAM OFFICE/AFPRO COMPARISON OF RELATIVE TASK SIZE AND PRIORITY

William K. Goss, Major USAF
Lyle W. Lockwood, Major USAF

SLSR 5-75B

UNITED STATES AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY
Wright-Patterson Air Force Base, Ohio

USAF SCN 75-20B AFIT Control Number SLSR 5-75B

AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. Please return completed questionnaires to: AFIT/SLGR (Thesis Feedback), Wright-Patterson AFB, Ohio 45433.

1. Did this research contribute to a current Air Force project?

   a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?

   a. Yes b. No

3. The benefits of AFIT research can often be expressed by the equivalent value that your agency received by virtue of AFIT performing the research. Can you estimate what this research would have cost if it had been accomplished under contract or if it had been done in-house in terms of man-power and/or dollars?

   a. Man-years _____ $ _____ (Contract).

   b. Man-years _____ $ _____ (In-house).

4. Often it is not possible to attach equivalent dollar values to research, although the results of the research may, in fact, be important. Whether or not you were able to establish an equivalent value for this research (3 above), what is your estimate of its significance?

   a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments:

1a

Name and Grade Position

Organization Location

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER SLSR #5-75B	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ACQUISITION PRODUCTION MANAGEMENT TASKS: A PROGRAM OFFICE/AFPRO COMPARISON OF RELATIVE TASK SIZE AND PRIORITY		5. TYPE OF REPORT & PERIOD COVERED MASTER'S THESIS 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) William K. Goss, Major, USAF Lyle W. Lockwood, Major, USAF		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Graduate Education Division School of Systems and Logistics Air Force Institute of Technology, WPAFB, OH.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of Research and Communicative Studies (SLGR) AFIT/SLGR, WPAFB, OH 45433		12. REPORT DATE August 1975 13. NUMBER OF PAGES 170
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES Approved for public release IAW AFR 190-17

JERRY C. HIX, Captain, USAF
Director of Information, AFIT

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Contract Administration
Program Management
Production Management
Acquisition Management
Manufacturing Operations

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Thesis Chairman: Martin Dean Martin, Lieutenant Colonel, USAF

ib

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DOD policy in the 1970's has reflected increasing concern with production management. Decisions to produce or to redirect production effort affect production efficiency and weapon system cost, schedule, and performance. The Air Force expects production management activities to be conducted under a close-working relationship between the program office and the contract administration office directly concerned with a weapon system program. Program decisions are directly influenced by opinions from the production elements of these offices. The study was designed to compare opinions of program office and Air Force Plant Representative Office (AFPRO) production elements about the production tasks they perform. Responses were analyzed to determine which tasks consumed the most time; which tasks were given the greatest priority; and perceptions of task time and importance existing in the counterpart production elements. The study showed that: program office and AFPRO production jobs tended to be similar in terms of time spent on particular tasks, but dissimilar in terms of task priority; AFPRO production elements tended to lack perception of the program office job; program offices tended to accurately perceive the AFPRO job; AFPROs tended to lack perception of program office priorities; and program offices tended to lack perception of AFPRO priorities.

ic

SLSR 5-75B

ACQUISITION PRODUCTION MANAGEMENT TASKS: A PROGRAM OFFICE/AFPRO COMPARISON OF RELATIVE TASK SIZE AND PRIORITY

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management (Procurement Major)

By

William K. Goss, M.S.
Major, USAF

Lyle W. Lockwood, B.S.
Major, USAF

August 1975

id

This thesis, written by

Major William K. Goss

and

Major Lyle W. Lockwood

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT (PROCUREMENT MAJOR)

DATE: 13 August 1975

Martin E. Martin
COMMITTEE CHAIRMAN

Donald B Benois
READER

ACKNOWLEDGEMENTS

The authors express their appreciation to all who have assisted in the preparation of this thesis.

Special thanks are due to those production management specialists in ASD and the AFPROs who took time from their duties to discuss them with us.

We also thank Lieutenant Colonel Martin D. Martin, our advisor, for his guidance and encouragement during the planning and reporting of the study.

Mr. Donald Benoit served as a reader for the thesis and contributed to the definition of the task structure around which the study was designed.

Special thanks is due to our families, who have essentially done without us during the past year.

Last, but by no means least, our appreciation goes to Mrs. Shirley Eckert for her patience and competence in the preparation and typing of this thesis.

TABLE OF CONTENTS

Page

Page

LIST OF TABLES

Page

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Statement of the Problem

Air Force acquisition production management is intended to be accomplished through interactions between the two organizations performing production management tasks related to a given procurement: the program office and the contract administration office (15:4-1). Directives to both organizations stress the need to establish effective working relationships (15:1-4). However, there is no published comparison of the production management tasks performed in the program office and similarly titled tasks performed in the contract administration office (10). In the interest of efficient and effective use of management resources it is desirable to find out: (a) what tasks the organizations perform; (b) if the organizations attach different priorities to tasks; and (c) if the organizations understand each other's tasks and priorities.

Significance of the Study

Production of defense supplies normally accounts for more expenditures than all the effort preceding the decision to produce (15:1-2). The government's concern

with production management, however, is not only a financial concern. Defense production decisions also affect defense readiness.

> The Government's involvement with production operations is predicated upon the importance to the nation of the procurement involved. Production failure directly impacts defense capability. Cost overruns due to production inefficiency may be reflected in reduction in vitally needed weapons and equipment. Contractors may be adversely impacted as well as the Government with consequent deterioration of an effective industrial base upon which effective production capability depends. Regardless of the type of contract involved, Air Force production management must effect program office/AFPRO/contractor involvement in sufficient depth to protect the interests of the Government. . . [15:4-1].

The Air Force recognizes that decisions to produce or to redirect production effort affect production efficiency and the cost, schedule and performance of a weapon system. The risks implicit in such production decisions are increasingly significant with a trend toward fewer alternative programs to turn to in the event of a production failure. The decisions themselves are influenced by the expertise and opinions of production management specialists in the program offices and contract administration offices (19).

This study examines the tasks performed by Air Force production specialists who contribute to production decisions.

Background

Top Management Attention

A memorandum (6) dated 31 July 1969, from the Deputy Secretary of Defense, The Honorable David Packard, to the Service Secretaries, asked for improvements in the weapon system acquisition process. In response to the memo, the Air Force evaluated and revised many areas of system acquisition policy. Production management was one of those areas singled out as worthy of consideration (22). This was demonstrated by the statement of Assistant Secretary of the Air Force for Installations and Logistics, Mr. Philip N. Whittaker (22), in his memorandum of 31 March, 1970:

> With the increased concern throughout DOD and in Congress over the effectiveness of our systems acquisition procedures, it is essential that all phases of the acquisition cycle be properly managed and controlled. A good deal of attention has been given to new system definition and development procedures and to procurement concepts. I wonder, however, if we have given sufficient consideration to the effective preparation for and management of the production phase of our major acquisition programs.

In the same memorandum, Secretary Whittaker asked that a comprehensive study be made of the entire area of production management. The objective of this study was to:

> Assess the adequacy of the organizational concepts, management practices, personnel and defined procedures to: (a) accomplish production planning during all phases of the acquisition cycle: (b) establish pertinent production criteria and assure these criteria are met and documented as a prerequisite for the production decision; and (c) effectively monitor and control the production program after that decision is made [22].

Secretary Packard (7) issued "Policy Guidance on Major Weapon System Acquisition" on 28 May, 1970, a letter that gave added meaning to the production management study requested by Secretary Whittaker. Key points of this letter were: (a) program scheduling must allow time for accomplishing important objectives without overlapping; (b) practical solutions must be found to low risk as well as high risk program elements; and (c) solutions to problems encountered in development plans must optimize production, maintenance and operating costs (7).

The production management study, completed in 1971, concluded that the production management function had been gradually diffused due to the attention given research, development and system performance by program management. Many of the elements of the production process were left in the hands of the prime contractors and the contract administration offices. Production staffs at the intermediate commands were generally of token strength (14:6).

Several changes in procedures and organization occurred within the Air Force following Secretary Packard's guidance (14; 15). Headquarters, U. S. Air Force Systems Command, in August, 1970, aligned production management more closely with system development by moving their Production Management and Quality Assurance offices from the Deputy Chief of Staff for Procurement and Production to the Deputy Chief of Staff for Systems (14:13).

Air Force Systems Command (AFSC) revised its

Production Management manual in May, 1971. The revised manual was ". . . intended for application throughout the acquisition life cycle [15:1-17." The procedures of the manual were to be applied ". . . in the depth and detail . . . as appropriate to program size and production complexity [15:1-17." Added emphasis on production management was provided by integration of production with design and development, introduction of the production readiness review and a call for participation by production managers in program management decisions (15:1-2).

In summary, the production management manual was oriented toward major weapon system acquistion. It called for a ". . . strong and mutually knowledgeable relationship between the program office and the contract administration office throughout the program life cycle [15:4-47." It indicated that production management activities prior to contract award and the production decision should be centered in the program office. After contract award the production management activities should be centered in the contract administration office to be:

> . . . conducted as an integral aspect of program management with procedures established to promote a close working relationship between production management elements of the program office and the contract administration office [15:4-47.

The production readiness review concept documented by AFSC Manual 84-3 (15) and AFSC Regulation 84-2 (16) caused production managers in program offices and contract

administration offices to jointly look in detail at contractor's production management systems and the state of production readiness. This examination extended beyond the Air Force, as AFSC and the Defense Contract Administration Service (DCAS) entered into a memorandum of agreement (4). The memorandum outlined support that DCAS would provide the Air Force when a production readiness review was conducted in a plant under the cognizance of DCAS.

Another result of the Air Force Production Management Study was the publication of a military standard on production management (21). This military standard, when cited in a contract, established contractual production management requirements for contractors and commensurate administration by Contract Administration Offices.

The Air Force Contract Management Division (AFCMD) increased emphasis upon the contract administration aspects of production management (9). The AFCMD, with program office participation, conducted in-depth surveys of manufacturing operations of contractors under AFCMD contract administration cognizance (9). Production readiness reviews were conducted, with team members provided by the AFCMD (9). To strengthen its monitoring of contractors' management systems, the AFCMD developed a network of management systems indicators to be used by each of the functional disciplines (13). The management system indicator procedure features a matrix that shows which findings by a specialist require coordination by other functional groups.

A Conceptual View of Production Management

Air Force System Command Manual 84-3 (15) presented a concept that the production management activities varied with the phases of a major system life cycle. The AFSC Manufacturing Methods Program develops the new production processes, techniques and equipment prior to the conceptual phase of the System Program. In the conceptual phase, production capability, risk assessments, production feasibility assessments, producibility criteria and trade-offs between production costs and schedules ascertain the ability to manufacture the conceived system. Tests and demonstration of material, tooling and processes are used to validate compatibility between product design and production/manufacturing techniques. During the full-scale development phase, production management activities concentrate upon the verification of producibility, production tests, and manufacturing methods selected. A review is performed of the system design status and the production system's readiness to proceed to the production phase. Activities concentrated in the production phase emphasize analysis of the manufacturing system and manufacturing methods to seek out areas for improvement. Corrective actions are taken to correct production difficulties. Throughout acquisition, contractor's actions are monitored and surveillance is accomplished through

close-working relationships established between the program office and contract administration office production elements. Near the end of the production phase, plans are executed to transition the system to Air Force Logistics Command and phase down the production program.

A similar view of the production system as a life cycle concept was presented by Chase and Acquilano in their text Production and Operation Management: A Life Cycle Approach (1). This theoretical view of production management appears to support the Air Force view of the need for shifts of management emphasis during the various life cycle phases. While selecting the product, considerations are given to the product decision and the design of the production function. The phase concerned with the design of the (production) system concentrates upon the activities of product design, process selection and physical layout. The quality control, production planning, scheduling and inventory systems are designed. Job Design and methods selection are key elements to the manning of the system phase which precedes the start-up of the system. While the system is in steady state, malfunctions are detected and corrections are made with the view of improving the system. The termination of the system completes the life cycle.

The authors' view of how these two concepts are related is presented in Figure 1.1. Both the Air Force and the Chase and Aquilano life cycle descriptions may be

	CONCEPTUAL	VALIDATION	FULL-SCALE DEVELOPMENT	PRODUCTION	
Mfg. Methods Program	Capability Feasibility Risk Assessment Trade-offs Documentation	Source Selection Production Planning Demonstrate Tooling Processes	Producibility Methods Production tests Surveillance Production Readiness Review	Mfg. Systems Analysis Mfg. Methods Analysis Surveillance Corrective Action	Transition Phase-down

Source: Adapted from Production Management, Air Force Systems Command Manual 84-3, 14 May 1971.

SELECTION OF THE PRODUCT	DESIGN OF THE SYSTEM	MANNING THE SYSTEM	START-UP OF THE SYSTEM	THE SYSTEM IN STEADY STATE	TERMINATION OF THE SYSTEM
Product Decision Design of the Production System	Product Design Process Selection Scheduling	Job Design Methods Analysis		Malfunctions Corrections Improvements	

Source: Adapted from Production and Operations Management: A Life Cycle Approach, Richard B. Chase and Nicholas J. Aquilano, R. D. Irwin, 1973.

Figure 1.1
A Comparison of Production Management Concepts

broken down into tasks which are concentrated in particular phases of the life cycle.

Related Studies

One conclusion from a review of published literature is that this production management task comparison does not duplicate previous research. Existing literature contains the results of research on related questions within a purchasing office or a contract administration office and in one case, both purchasing offices and contract administration offices.

Hood (3) investigated the differences among jobs with the same title - contracting officer, but performed in different purchasing organizations. Hood's comparison did not extend to the contract administration environment.

Stormo and Heitz (12) evaluated the degree of functional relationship between the program office and the contract administration office (specifically AFPRO); however, functional relationships were not identified to specific functional specialties, such as production management.

A study by Potts and Mollwitz (8) evaluated production management tasks as performed by various contract management organizations with the objective of determining if a single DOD agency should perform the production management functions of contract administration. The scope of the Potts and Mollwitz study was limited to the functions

performed by the contract administration office and was completed prior to major reorganization of the DOD structure for contract administration resulting from the DOD Project 60 study of the early 1960's (20).

Engan and Hergenroeder (2) investigated contract administration office (specifically DCAS) selected production management tasks as accomplished by the DCAS production specialists in their dealings with contractor counterparts. This last study examined the means used by DCAS production specialists to obtain production status information from contractors.

Scope

Management of defense acquisition encompasses a variety of functions which are performed in purchasing offices, in contract administration offices, or in staff offices at various echelons of defense organizations (17). This study was limited to tasks prescribed for or performed by Air Force production functional specialists in program offices of the Aeronautical Systems Division of Air Force Systems Command and in Air Force Plant Representative Offices (AFPROs) under the Air Force Contract Management Division of the Air Force Systems Command. Comparisons were made for program offices and AFPROs dealing with the same contractors for programs in various phases of the program life cycle defined in Air Force Regulation 800-2 (18). The study will exclude contract administration

performed by Defense Contract Administration Service (DCAS) of the Defense Supply Agency and procurement of supplies under contracts issued by Air Force organizations outside Aeronautical Systems Division. Figure 1.2 illustrates the organizational placement of the organizations included in the study and the referenced organizations which were excluded.

Objectives

The overall objective of this study was to examine production management task relationships between program offices and Air Force Plant Representative Offices (AFPROs). Specific objectives were as follows:

1. Determine production management tasks performed by program offices.

2. Determine production management tasks performed by AFPROs.

3. Determine how AFPRO production management personnel view the task structure of program office production elements.

4. Determine how program office production management personnel view the task structure of AFPRO production elements.

5. Identify differences in performed production management tasks between program offices and AFPROs.

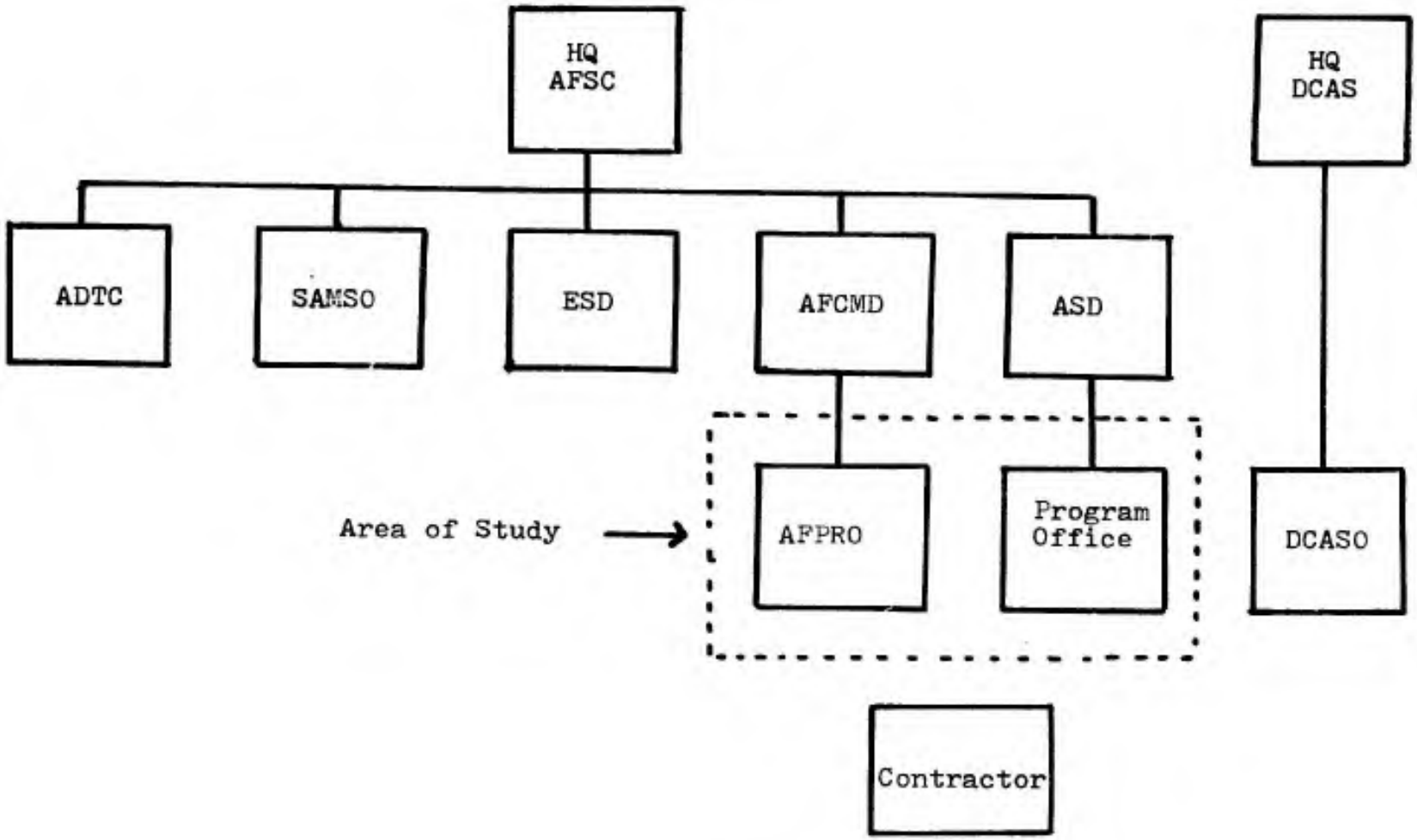

Figure 1.2

Organizational Placement of Studied Organizations

Research Hypotheses

1. There is no difference between the production management tasks performed in a program office and the production management tasks performed in an AFPRO.

2. There is no difference between the production management tasks performed in a program office and the production management tasks which AFPRO production elements believe are performed in a program office.

3. There is no difference between the production management tasks performed in an AFPRO and the production management tasks which program office production elements believe are performed in an AFPRO.

4. There is no difference between the production management tasks considered important by the production element of an AFPRO and the tasks considered important by the production element of a program office.

5. There is no difference between the production management tasks considered important by a program office and the production management tasks which AFPRO production elements believe to be important to a program office.

6. There is no difference between the production management tasks considered important by an AFPRO and the production management tasks which program office production elements believe to be important to an AFPRO.

CHAPTER II

METHODOLOGY

The previous chapter described the background of the current production management situation concerning Air Force weapon system acquisitions and related the current situation to production management theory. Also described were the objectives and the research hypotheses to which this study was addressed.

This chapter describes the method of the study. Following an overview, the methodology is explained by examining the principal areas of procedure. These principal areas are: (a) the major assumptions underlying the study, (b) factors which limit use of information obtained, (c) sources of the research data, (d) parameters studied in the populations sampled, (e) data collection techniques, and (f) data analysis.

Overview of the Method

Primary data sources were used in this research. Structured responses concerning a predetermined set of tasks were obtained from production management specialists at the journeyman level and, in some instances, at the supervisory level. In addition to the structured responses, opportunities were provided for respondents to add to the

task list presented to them or to expand on their choice of a structured response.

Interviews were conducted in program offices (POs) and in their counterpart Air Force Plant Representative Offices (AFPROs). Data obtained in each interview pertains to: (a) the time expended in the respondent's organization on particular tasks, (b) the importance to the respondent's organization of particular tasks relative to program decisions, (c) the perception of time spent by the counterpart organization on particular tasks, (d) the perception of importance to their counterpart organization of particular tasks relative to program decisions, and (e) the perceived weapon system life cycle phase applicable to the program.

Interview data concerning each task question were reduced to a single response for each organization. The set of task responses for paired organizations was subjected to nonparametric statistical tests to determine acceptance or rejection of hypotheses. Open end response data were used to interpret information provided by the statistical analysis.

Assumptions

The following assumptions underlie the research:

1. An individual production specialist's perception concerning a production task was representative of his organization's perception. Associations, based on experience, which form a construct of reality constitute

perceptions (23). Interorganizational perceptions are one basis for an effective working relationship between program office and AFPRO production elements (10).

2. Researchers' judgment applied in reconciling different individual perceptions into organizational responses had a random effect upon the rank ordering of task responses.

3. Failure to interview all production specialists did not influence an organization's summary responses.

4. The list of tasks presented to each organization was sufficiently complete to prevent unknown omitted tasks from influencing the study results.

5. A few responses to a broad range of tasks provided meaningful data not obtainable from a large number of responses to a narrow range of tasks.

6. The ordinal level data obtained on a six point scale permitted significant response discrimination to allow conclusions to be drawn from rank ordered responses.

Limitations

The following factors limit use of the study results:

1. Inferences cannot be made beyond the production elements of ASD program offices and the production elements of AFPROs performing production management on ASD programs. It should be recognized that a larger family of related production elements exists among organizations concerned with AFSC acquisition programs. These organizations include:

(a) the staff offices of the intermediate commands of AFSC (15) [ASD, Electronic Systems Division (ESD), Space and Missiles Systems Organization (SAMSO), and the Armament Development and Test Center (ADTC)]; (b) the program offices of ESD, SAMSO and ADTC; (c) other Department of Defense organizations [Army, Navy, DCAS] performing contract administration for AFSC programs; (d) Headquarters AFCMD, the parent organization for all AFPROs; (e) AFPROs not administering ASD programs; and (f) Headquarters AFSC.

2. The research does not address how well tasks are performed or whether the order of importance perceived among tasks is a "proper" order.

Data Sources

The research data sources are described in terms of two populations from which a paired sample was drawn, parameters of those populations which are pertinent to the study effort, and the characteristics of the sample selected.

Description of the Populations

Two populations of production elements were considered in this study. A production element is defined as an organizational grouping of specialists assigned production management tasks (15). These populations are linked by a common involvement with Air Force weapon system programs.

Population I

The first population consists of the production elements of program offices of the Aeronautical Systems Division (ASD) of Air Force Systems Command. These program offices are located at Wright-Patterson AFB, Ohio.

Population II

The second population consists of the production elements of AFPROs primarily responsible for administration of those Air Force programs managed by system or subsystem program offices of ASD.

Selection of the Sample

The sample for this study consisted of six production elements related to three selected ASD managed weapon system programs. Three of the production elements represented Population I, the ASD program offices. Paired with each program office production element was its respective AFPRO production element from Population II.

A preliminary survey of ASD was made to match the production elements by program. This survey identified 31 programs or major subprograms, 10 of which were administered by Navy or DCAS organizations. The remaining 21 programs were managed by 17 program offices and administered by 10 AFPROs.

Three programs were randomly selected from the list of 21. Discussion with each program to determine acceptance

of the research team failed to identify a production relationship between one Validation Phase program and any AFPRO. As a result, the Validation Phase program was dropped from the study. From the remaining ASD programs, a major subprogram was randomly selected. The final sample used in the study thus consisted of the program office and AFPRO production elements for Program A, a major aircraft subprogram in the Full-scale Development phase; Program B, an aircraft program midway through the Production phase; and Program C, a missile program near the end of the Production phase.

Population Parameters Pertinent to the Study

Six parameters of each population were examined. If the words "program office" and "AFPRO" are interchanged, the lists are identical. Separate presentation is used to allow specific wording and avoid confusion.

Population I

The parameters of population I studied were:

1. Production management tasks specified by AFSC Manual 84-3, (15:Attachment 1) for accomplishment by program offices.

2. Subjective determinations by program office production specialists of the time that their production element spent on specific production tasks.

3. Subjective determinations by program office

production specialists of the relative importance of specific production management tasks.

4. Subjective determination by program office production specialists of the time AFPRO production specialists spent on tasks performed for the program.

5. Subjective determination by program office production specialists of the relative importance AFPRO production specialists attached to specific production management tasks.

6. Subjective determination of the Acquisition Life Cycle phase in which program office production specialists perceived their program to be operating. Phases of the Acquisition Life Cycle are defined by AFR 800-2 as Conceptual, Validation, Full-scale Development and Production (18). As discussed in Chapter I, tasks identified for program offices by AFSCM 84-3 (15) vary with these phases.

Population II

The parameters of Population II studied were:

1. Production management tasks specified by AFSC Manual 84-3, (15:Attachment 1), for accomplishment by contract administration offices.

2. Subjective determination by AFPRO production specialists of the time their production element spent on specific production tasks.

3. Subjective determination by AFPRO production specialists of the relative importance of specific production management tasks performed for a program.

4. Subjective determination by AFPRO production specialists of time program office production specialists spent on tasks performed for the program.

5. Subjective determination by AFPRO production specialists of the relative importance program office production specialists attached to specific production management tasks.

6. Subjective determination of the Acquisition Life Cycle phase in which AFPRO production specialists perceived a program to be operating.

Data Collection

Data collection effort included selection of the interview technique, design of an interview schedule, validation of the schedule, and conduct of the actual interview activity.

The Interview Technique

The structured interview technique allowed the researchers to obtain detailed data in addition to the structured responses sought. This additional information was invaluable in reconciling differences among responses within an organization because it indicated the frame of reference from which structured responses were given.

Interviewing further allowed the interview instruments to be reduced to a few reusable visual aids, with responses recorded on one common form. The interviewer was also able to adjust to variation in the number of specialists available by shifting to a different sample plan.

The primary difficulty in the interview approach is the possibility of the interviewer influencing the response. This difficulty was avoided in the research. A "learning curve" approach was used before data recording to estimate the respondent's susceptibility to influence. Details of this approach are discussed later in this chapter under the topic of conduct of the interview.

Design of the Interview Schedule

Design effort for the interview schedule was focused on the form of the schedule and the content of the task descriptions and interview questions.

Form of the Schedule

The interview schedule was prepared in loose leaf form and consisted of six parts. These parts were: (a) an introduction (See Appendix A); (b) a notebook containing a list (See Appendix B) of 26 numbered task descriptions, one to a page; (c) a single sheet (See Appendix C) containing four questions and a scale of responses used by each

program office respondent for each task presented; (d) a similar single sheet question set (See Appendix D) used by each AFPRO respondent for each task; (e) a set of response sheets (See Appendix E) used by the interviewer to record responses; and (f) a single sheet (See Appendix F) used by the respondent to record an opinion on the current program position in the weapon system life cycle.

Content of the Schedule

Primary attention in design of the interview schedule was given to the content of the various forms. The initial draft of the list of tasks contained in Appendix B was extracted from AFSC Manual 84-3 (15) by the researchers and supplemented in the final form by review of other directives.

Four questions were asked concerning each task. Responses were recorded on a six point ordinal scale, with provisions for answers of Not Applicable, No Opinion, or Other Response.

The option response Not Applicable was defined for the respondent to mean that the task was not the responsibility of the organization that was the object of the question being asked. An ordinal value of Zero was assigned to this response. A None response was defined such that the task was applicable within the range of the organization's responsibility but that no effort or priority was attached to the task. An ordinal value of one was

assigned to this response. A No Opinion response was adjudged to mean both a true "no opinion" response and a "do not know" response. For purposes of this study, either response indicated a lack of perception of inter-organizational interaction. The No Opinion response received a zero value on the ordinal scale. Other Response response was used to indicate that some comment had been provided by the respondent in lieu of one of the mutually exclusive response options. No ordinal value was assigned to this response.

The wording of the question sets in Appendices C and D were prepared by the researchers, as was the phase diagram in Appendix F and the Introduction in Appendix A. Each of the parts of the interview schedule was then validated.

Validation of the Interview Schedule

Validation of the interview schedule was performed in two parts before the schedule was used to obtain data; expert opinion was obtained, and a pilot study was performed.

Expert opinion was sought to assure; (a) completeness and clarity of the task list, (b) clarity of the question sets, and (c) clarity of choices provided on the ordinal scales. The experts consulted and their areas of expertise are listed in Appendix G.

The pilot study included both program office and

AFPRO production management experience from organizations outside the sample. An officer with recent AFPRO experience provided pilot study responses from his AFPRO experience. Two other officers, one currently performing program office production management tasks and one with recent program office experience, provided program office responses. The list of participants in this pilot study is contained in Appendix G.

Each participant in the pilot study was asked at the end of the interview to critique the content of the schedule and the conduct of the interview. The comments provided by these participants improved the conduct of the actual data collection interviews. Specific areas of improvement are noted in the discussion of the conduct of the interviews.

Conduct of Data Collection Interviews

Data collection was performed during one trip to the AFPROs and repeated visits to the ASD program offices. In each organization, an introductory discussion was held with the ranking production management official to explain the purpose for which data would be used and to find out how many respondents would be available to participate in the study.

An interview control number and the set of production tasks associated with each interview were recorded on the response sheets prior to the interview. This

technique was suggested during the pilot study and minimized distraction during the actual interview. The response sheets thus formed the outline for the interview and assured matching of responses with the proper task number.

Tasks were assigned to sets in advance of data collection using a computer program (See Appendix H) written by the researchers. The logic of this program creates a number of task sets equal to the expected number of respondents, with each task number appearing randomly in two sets. When each task number has been assigned twice, the program randomly selects task numbers to make each task set of equal size. The output from this program for all expected numbers of respondents within an organization was handcarried by the researchers to allow flexibility in adjusting to the available number of respondents. A sample of the program output is also included in Appendix H.

Interviews with production specialists were conducted in conference rooms or away from their desks. Each interview was opened with the information contained in Appendix A. The respondent was then asked if there were any questions concerning the conduct of the interview.

Following the introduction, the respondent was given the question sheet from Appendix C or Appendix D appropriate to his organization, and the scales of desired responses were explained.

To estimate acceptance of the response scales and to judge how freely respondents formed their own opinions, one or two tasks were added to the front of each task set. This was another suggestion from the pilot study. These tasks were added to eliminate the "learning curve" effect in the interview and responses were not included in the data used from the task set.

If response to questions about these added tasks indicated the respondent might be easily influenced by any comments from the interviewer, care was taken to avoid comment. If definite opinions were expressed, the interviewer was free to encourage elaboration on the responses. This approach is believed to have minimized distortion of responses on the ordinal scales, although the open-end data may be biased toward those who expressed opinions freely.

After completion of the predetermined task set, the respondent was asked to describe any tasks about which he had not been asked. The intent of this question was two-fold. First, the question served to identify any tasks not included in the task list of Appendix B. Second, the question elicited information useful in reconciling responses about tasks included in other task sets. For each task identified in this manner, the respondent was asked the same set of four questions asked about all other tasks.

At the conclusion of each interview, the respondent

was asked to mark a copy of the sheet shown in Appendix F. This information was used as a control check on the weapon system life cycle frame of reference from which respondents were answering. The question was asked at the end of the interview to avoid biasing responses by suggesting that certain tasks might be expected in particular life cycle phases.

Data Analysis

Data analysis methodology included: summarization of individual responses by task for each organization; reconciliation of divergent responses on each task; ranking of reconciled responses; performing statistical analyses to (a) test the hypotheses presented in Chapter I, and (b) examine homogeneity within program office and AFPRO populations; and analysis of response patterns contributing to the statistical results obtained.

Summarization by Organization

Individual response sheet entries were transcribed onto a summary sheet (See Appendix I) by task for each organization and further transcribed to a computer data file. The researchers prepared a series of computer programs to analyze individual responses by task, by organization and by respondent. This information was used in reducing individual responses to organizational responses.

Reconciliation Into Organizational Responses

Individual responses for each task question were reconciled by the researchers into one organizational response for each task question. These responses were annotated directly on the summary sheets (See Appendix I). The reconciled scale values reflect subjective judgment on the part of the researchers in interpreting divergent responses. The judgment was applied, however, without attempting to influence the rank of any particular task. Further, reconciliation was performed before any attempt was made to rank order responses on any task question. This subjective judgment is therefore assumed to have a random effect on the rank ordering of task responses.

Ranking of Reconciled Responses

Rankings assigned to task question responses were obtained by ordering each set of responses by scale values. The task with the highest scale value was assigned a rank value of one. The task with the lowest scale value was assigned a rank value of 26. Ties on task response rankings were reconciled according to the precedure developed by Spearman (11:217) under which each tied response is assigned the average rank value for the ranks concerned. For example, three task responses tied for the third, fourth and fifth rank values, would each be assigned a rank value of four.

The ranking process produced 24 sets of rank valued task responses; one set for each question from each of the six organizations visited.

Statistical Analyses

Statistical procedures employed in this study were tests of the Kendall rank correlation coefficient (11:213), and the Kendall coefficient of concordance (11:229).

The Kendall Rank Correlation Coefficient (Tau)

The Kendall rank correlation coefficient (11:213) measures the degree of association between two arrays of ordinal measurements of a common group of items. The value for Tau is obtained by arranging one array in rank order and then examining the corresponding rank values for the second array. The procedure considers all possible pairs of rank values in the second array, adding to the value of Tau for values which are in "natural" order, subtracting for pairs out of order, and making allowances for ties in either array. If the arrays are in perfect agreement with no ties, the value of Tau is 1.00, indicating the maximum possible agreement. If the arrays are in reverse "natural" order with no ties, the value of Tau is -1.00. According to Siegel (11:215) Tau is a function of the minimum number of interchanges of ranks necessary to transform the second array into the same order as the first array and may be considered as a coefficient of disarray between two rankings.

The computation of Tau was based on the following

formula from Kendall (5:35):

$$\text{Tau} = \frac{S}{\sqrt{\left(\tfrac{1}{2} N (N-1) - T\right)}\ \sqrt{\left(\tfrac{1}{2} N (N-1) - U\right)}}$$

Where:

S = the sum of the products of indexes for each possible pair in each ranking. A pair in order has an index of +1. A pair tied has an index of 0. Thus a pair tied on either rank contributes nothing to S, whatever the sign of the other rank.

N = the total number of objects ranked.

$T = \frac{1}{2} \sum t\,(t-1)$, where:

t = the number of ties on a specific rank in the first array.

U = the identical computation performed for T, but applied to the second array.

The significance of Tau is that if the two arrays of ranks are unrelated, any possible order of the second array is equally likely, each with an associated value for Tau. Kendall (5:55) has shown that these values of Tau for N greater than or equal to eight is closely approximated by the normal distribution. A normal probability distribution may therefore be used to test the null hypothesis that no agreement exists in the rank orders present in the two arrays.

The specific test of the null hypothesis is performed by comparing a value of Z for the rank order comparison to a critical value of Z obtained from a normal distribution. The critical Z value identifies the allowable

probability of erroneously rejecting the null hypothesis when the null hypothesis is true.

The Z value for the rank order comparison is computed by the following formula from Siegel (11:221):

$$Z = \frac{\text{Tau}}{\sqrt{\frac{2\ (2N+5)}{9N\ (N-1)}}}$$

In this formula Tau and N are defined as they have been used previously. The denominator in this formula is the standard deviation of Tau.

Hypothesis Testing

The generalized hypothesis tested by each pair of rankings compared is that the program office and AFPRO opinion on amount of time or relative importance of production tasks have no degree of association or agreement.

The decision rule for hypothesis testing is based on a significance level of .05. A significant inverse relationship or a significant positive relationship is considered equally conclusive for rejection of the null hypothesis of no agreement. The test therefore becomes "two tailed", assigning half of the acceptable probability of error to either tail of the normal distribution expected under the null hypothesis. Any computed value of Z which is equal to or greater than 1.96 or equal to or less than -1.96 will cause the null hypothesis to be rejected. The

probability of erroneously rejecting the null hypothesis at the critical Z values is thus .025. A Z value from the statistical test which exceeds the critical value will indicate a lesser probability of erroneously rejecting the null hypothesis. Results of hypothesis test decisions based on the value of Z are supplemented by reporting the associated probability value.

The specific null hypotheses considered for each weapon system program in this study were:

Null Hypothesis H1. There is no agreement in the rank order of the amount of time spent on specific production tasks by a program office production element and an AFPRO production element.

Null Hypothesis H2. There is no agreement in the rank order of the amount of time spent on specific production tasks by a program office production element and the rank order of the amount of time an AFPRO thinks a program office spent on specific tasks.

Null Hypothesis H3. There is no agreement in the rank order of the amount of time spent on specific production tasks by an AFPRO production element and the rank order of the amount of time a program office thinks an AFPRO spent on specific tasks.

Null Hypothesis H4. There is no agreement in the rank order of the relative importance attached to production tasks by a program office and an AFPRO.

Null Hypothesis H5. There is no agreement in the rank order of the relative importance attached to production tasks by a program office and the rank order of the relative importance an AFPRO thinks a program office attached to tasks.

Null Hypothesis H6. There is no agreement in the rank order of the relative importance attached to production tasks by an AFPRO and the rank order of the relative importance a program office thinks an AFPRO attached to tasks.

Appendix J shows the interview question response arrays paired for each program for testing of each null hypothesis.

Implications of Hypothesis Test Results

The following discussion presents the implications which may result from rejection or failure to reject each null hypothesis.

A null hypothesis for statistical test is usually stated precisely, and occasionally in a stilted manner. This type of wording stems from two particular problems in research. First, rejection of a hypothesis is a stronger statement than is the failure to reject. Failure to reject cannot be strictly equated with "acceptance." This leads to a tendency to state "the other side" of the researcher's thoughts on a subject. Second, hypotheses are often constrained by the nature of conclusions which can be drawn from existing statistical tests.

This study encountered the second difficulty in combination with the nature of the particular population parameters studied. Two of the interview questions dealt with perceptions of respondents' counterpart organizations. The end result is that interpretation of hypotheses is necessary.

The test of the Kendall rank correlation coefficient requires a null hypothesis of "no agreement." Rejection of a null hypothesis can therefore be interpreted as

indicating agreement between the rankings compared. Failure to reject, however, does not "prove" disagreement. What can be said is that failure to reject indicates the absence of agreement. Failure to reject a hypothesis will, therefore, be cause for "retention" of a hypothesis until evidence supporting rejection might be obtained.

Hypothesis H1

Retention of Hypothesis H1 would indicate disagreement, in the sense of no correlation of agreement between program office and AFPRO production elements in the rank ordering of tasks according to time spent. The implication of disagreement would be that the program office and AFPRO production jobs are different in terms of time spent on tasks.

Rejection of Hypothesis H1 would indicate a correlation of agreement between the program office and AFPRO production elements in the rank ordering of tasks according to time spent in their respective offices. The implication of agreement would be that the two jobs are similar in terms of time spent on tasks.

Hypothesis H2

Retention of Hypothesis H2 would indicate disagreement between the program office and AFPRO production elements in the rank ordering of tasks according to opinions of where the program office production element spent its time. The implication of disagreement would be that the

AFPRO production element may not perceive the nature of the program office production job. Lack of this perception may detract from an effective working relationship between the program office and AFPRO production elements.

Rejection of Hypothesis H2 would indicate a correlation of agreement between the program office and AFPRO production elements in the rank ordering of tasks according to opinions of where the program office production element spent its time. The implication of agreement would be that the AFPRO production element perceived the nature of the program office production job. This perception is assumed to be one basis for an effective working relationship between the program office and AFPRO production elements.

Hypothesis H3

Retention of Hypothesis H3 would indicate disagreement between program office and AFPRO production elements in the rank ordering of tasks according to opinion of where the AFPRO production element spent its time. The implication of disagreement would be that the program office production element may not perceive the nature of the AFPRO production job. Lack of this perception may detract from an effective working relationship between the program office and AFPRO production elements.

Rejection of Hypothesis H3 would indicate a correlation of agreement between the program office and AFPRO

production elements in the rank ordering of tasks according to opinion of where the AFPRO production element spent its time. The implication of agreement would be that the program office production element did perceive the nature of the AFPRO production job. This perception is assumed to be one basis for an effective working relationship between the program office and AFPRO production elements.

Combined Implications of Hypotheses H2 and H3

A conclusion that there is a basis for an effective working relationship between the production elements of a program office and an AFPRO would require rejection of both Hypothesis H2 and Hypothesis H3.

Hypothesis H4

Retention of Hypothesis H4 would indicate disagreement between program office and AFPRO production elements in the rank ordering of tasks according to relative importance. The implication of disagreement would be that the two organizations were different in terms of importance attached to production tasks.

Rejection of Hypothesis H4 would indicate a correlation of agreement between the program office and AFPRO production elements in the rank ordering of tasks according to relative importance perceived in their respective organizations. The implication of agreement would be that the two jobs were similar in terms of importance attached to the various production tasks.

Hypothesis H5

Retention of Hypothesis H5 would indicate disagreement between program office and AFPRO production elements in the rank ordering of tasks according to opinions of the importance attached by the program office. The implication of disagreement would be that the AFPRO may not perceive the nature of the program office production job in terms of task importance. Lack of this perception may detract from an effective working relationship between the program office and AFPRO production elements due to built-in underlying conflicts of interests.

Rejection of Hypothesis H5 would indicate a correlation of agreement between the program office and AFPRO production elements in the rank ordering of tasks according to opinions of the importance attached by the program office. The implication of agreement would be that the AFPRO perceived the nature of the program office production job in terms of task importance. This perception is assumed to be one basis for an effective working relationship between the program office and AFPRO production elements.

Hypothesis H6

Retention of Hypothesis H6 would indicate disagreement between program office and AFPRO production elements in the rank ordering of tasks according to opinions of the importance attached by the AFPRO. The implication of disagreement would be that the program office production

element may not perceive the nature of the AFPRO production job in terms of task importance. Lack of this perception may detract from an effective working relationship between the program office and AFPRO production elements due to built-in underlying conflicts of interest.

Rejection of Hypothesis H6 would indicate a correlation of agreement between the program office and AFPRO production elements in the rank ordering of tasks according to opinions of the importance attached by the AFPRO. The implication of agreement would be that the program office does perceive the nature of the AFPRO production job in terms of task importance. This perception is assumed to be one basis for an effective working relationship between the program office and AFPRO production elements.

Combined Implications of Hypotheses H3 and H6

A conclusion that the AFPRO production element supports the program office production element would require rejection of both Hypothesis H3 and Hypothesis H6. This conclusion is based on the following premise. If the AFPRO supported the program office, the AFPRO would be spending time and placing importance on tasks in the order the program office thinks exists.

A summary of the implications of retention or rejection of each hypothesis and of combinations of hypotheses is presented in Figure 2.1.

HYPO-THESIS	IMPLICATIONS OF DECISION TO:		REQUIRED DECISIONS TO CONCLUDE:		
	RETAIN	REJECT	Are Similar	Effec-tive Inter-Face	AFPRO Supports PO
H1	Dissimilar Time Ranking	Similar Time Ranking	Reject		
H2	AFPRO Does Not Under-stand PO	AFPRO Does Under-stand PO		Reject	
H3	PO Does Not Understand AFPRO	PO Does Under-stand AFPRO		Reject	Reject
H4	Dissimilar Importance Ranking	Similar Impor-tance Ranking	Reject		
H5	AFPRO Does Not Under-stand PO	AFPRO Does Under-stand PO		Reject	
H6	PO Does Not Understand AFPRO	PO Does Under-stand AFPRO		Reject	Reject

Figure 2.1

Implications of Null Hypothesis Test Results

The Kendall Coefficient of Concordance (W)

If the test of the rank correlation coefficient does not cause rejection of a null hypothesis of no agreement in rank ordering, there is no assurance that rankings are unrelated. If agreement exists, however, the Kendall coefficient of concordance (11:229) measures the extent of association among several sets of rankings. The implication of concordance to this study is that the various program office or AFPRO rankings of responses might be combined to identify a general order of tasks by time consumed or priority assigned in program offices or AFPROs.

The coefficient of concordance is computed by the following formula (11:234):

$$W = \frac{S}{1/12\ K^2\ (N^3-N) - K\sum T}$$

Where:

S = the sum of squares of deviations from the average ranking for each item ranked.

K = the number of sets of rankings

N = the number of items ranked

$$T = \frac{\sum (t^3-t)}{12}$$

The denominator of the above formula is the maximum possible sum of the squared deviations under perfect agreement.

The value of W can therefore be interpreted as a coefficient of disarray as was Tau, the rank correlation coefficient. Since W is computed from squared values, the degree of agreement is reflected by the degree of variance among the sums of ranks. The null hypothesis of no agreement among rankings therefore states that W follows a Chi-Square distribution for N-1 degrees of freedom (11:236).

Four supporting null hypotheses were tested under the concordance procedure:

> Null Hypothesis S1. There is no agreement among program office production entities on the rank order of production tasks according to time required.
>
> Null Hypothesis S2. There is no agreement among program office production entities on the rank order of production tasks according to perceived importance.
>
> Null Hypothesis S3. There is no agreement among AFPRO production entities on the rank order of production tasks according to time required.
>
> Null Hypothesis S4. There is no agreement among AFPRO production entities on the rank order of production tasks according to perceived importance.

The specific task questions used for testing these hypothesis are shown in Appendix J.

Response Patterns

Specific tasks indicating high agreement or high disagreement with respect to each hypothesis were identified by examining rank differences for each pair of rankings

compared. This methodology (See Appendix L) supplements the concordance approach by graphically illustrating the different responses and the direction of the differences.

Summary

This chapter has described the method of the study. Data collection was performed by interviewing production specialists in a sample of six program office and AFPRO production entities paired by three weapon system programs. The data collection process was described in terms of design and conduct of the interviews. Data analysis techniques and statistical procedures were described. Descriptions were provided for the Kendall rank correlation coefficient test and the Kendall coefficient of concordance which were used to test hypotheses.

Chapter III will present the analyzed data and conclusions from the data analysis.

CHAPTER III

FINDINGS AND CONCLUSIONS

The findings of the study are displayed in two principal ways. The first display is from the frame of reference set by the hypothesis and the second is from the frame of reference set by the program.

The display for each of the six hypotheses includes two subsections for each program: findings and conclusion. The findings subsection includes (a) a reference to the table in Appendix K which contains the data related to the hypothesis and program, and (b) the statistical decision from the null hypothesis test for the hypothesis and program. Tasks that met the significant difference criteria of Appendix L are identified in each table of Appendix K. The conclusion subsection contains the inference drawn from the results of the null hypothesis test according to the rules in Figure 2.1.

Each table in Appendix K contains (a) arbitrarily sequenced list of production management tasks with abbreviated titles; (b) the reconciled ordinal response values for each task, derived from the interviews for the program office and AFPRO production elements; (c) the rank order scores for the ordinal values of each task using the average rank scores for ties (11:217) for the program office and

AFPRO production elements; (d) the signed difference of the two rank order scores for each task; (e) the value of Tau computed by using the Kendall rank order correlation coefficient; and (f) the Z value applicable to the computed Tau. A Z value greater than 1.96 is sufficient cause to reject the null hypothesis.

For each hypothesis, the result for the third program is followed by a summary of the results for the three programs.

The second display presents the same summary data presented in the analysis by hypothesis, but arrayed by program. Within this second display, the results of the hypothesis tests are analyzed within the context of a program.

Hypothesis Test Findings and Conclusions

Hypothesis H1

There is no agreement in the rank order of the amount of time spent on specific production tasks by a program office production element and an AFPRO production element.

Program A

Findings

Table K.1 presents the data from the production elements for Program A which relate to the Hypothesis H1 test. Hypothesis H1 for Program A was rejected with a probability value of .0125. For Program A, the rank order

of time spent on production tasks by the program office and AFPRO indicated agreement.

Conclusion

In terms of the time spent on the production management tasks for Program A, the program office and AFPRO production element jobs were similar.

Program B

Findings

Table K.2 presents the data from the production elements assigned to Program B. Hypothesis H1 for Program B was rejected with a probability value of .0170. For Program B, the rank order of time spent on production tasks by the program office and AFPRO indicated agreement.

Conclusion

In terms of the time spent on the production management tasks for Program B, the program office and AFPRO production element jobs were similar.

Program C

Findings

Table K.3 presents the data from the production elements assigned to Program C. Hypothesis H1 for Program C was retained with a probability value of .0571. For

Program C, the rank order of time spent on production tasks by the program office and AFPRO indicated no agreement.

Conclusion

In terms of time spent on the production management tasks for Program C, the program office and AFPRO production element jobs were dissimilar.

Hypothesis H1 Summary of Three Programs

Findings

A summary of the statistical results for Programs A, B and C is presented in Table 3.1. Two of the three pairs of program office and AFPRO production elements' rank order of time spent on production management tasks indicated agreement.

Table 3.1

Hypothesis H1 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.31	2.24	Reject	.0125	Table K.1
B	.30	2.12	Reject	.0170	Table K.2
C	.22	1.58	Retain	.0571	Table K.3

Conclusion

There was a tendency for the program office and AFPRO production elements' jobs to be similar in terms of time spent on the spectrum of production management tasks.

Hypothesis H2

> There is no agreement in the rank order of the amount of time spent on specific production tasks by a program office production element and the rank order of the amount of time that an AFPRO thinks a program office spends on specific tasks.

Program A

Findings

Table K.4 presents the data from the production elements assigned to Program A which related to the Hypothesis H2 test. Hypothesis H2 for Program A was retained with a probability value of .0256. Although close to the decision rule probability value of .0250, the rank order of time spent on production management tasks by the program office indicated disagreement with what the AFPRO production element expected.

Conclusion

For Program A, the AFPRO did not perceive where the program office production element spent its time.

Program B

Findings

Table K.5 presents the data collected from the production elements assigned to Program B which related to Hypothesis H2. Hypothesis H2 for Program B was rejected with a probability value of .0001. The rank order of time spent on production management tasks by the program office indicated agreement with what the AFPRO production element expected.

Conclusion

The AFPRO B production element appeared to understand where the program office spent its time.

Program C

Findings

Table K.6 presents the data from the production elements assigned to Program C which related to the Hypothesis H2 test. Hypothesis H2 for Program C was retained with a probability value of .1379. The rank order of time spent on production management tasks by the program office indicated disagreement with what the AFPRO production element expected.

Conclusion

The AFPRO C production element did not perceive where the program office production element spent its time.

Hypothesis H2 Summary of Three Programs

Findings

A summary of the statistical results for the three programs is presented in Table 3.2. Two of the three AFPRO production elements' perception of the program office rank order of time indicated disagreement with the program office rank order of time spent.

Table 3.2

Hypothesis H2 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.27	1.95	Retain	.0256	Table K.4
B	.53	3.80	Reject	.0001	Table K.5
C	.15	1.09	Retain	.1379	Table K.6

Conclusions

The AFPRO production elements tended to lack perception of the program office production job.

The lack of a significant pattern in terms of tasks contributing to agreement or disagreement indicates that AFPROs need to become more familiar with the total job profile of the program offices if the basis for an effective working relationship is to be established.

Hypothesis H3

There is no agreement in the rank order of the amount of time spent on specific production tasks by an AFPRO production element and the rank order of the amount of time a program office thinks an AFPRO spends on specific tasks.

Program A

Findings

Table K.7 presents the data from the production elements assigned to Program A which related to the Hypothesis H3 test. Hypothesis H3 for Program A was retained with a probability value of .0465. The rank order of the amount of time spent on production management tasks by the AFPRO indicated disagreement with what the program office production element expected.

Conclusion

For Program A, the program office did not perceive where the AFPRO production element spent its time.

Program B

Findings

Table K.8 presents the data from the production elements assigned to Program B which related to the Hypothesis H3 test. Hypothesis H3 for Program B was rejected with a probability value of .0032. The rank order of the amount of time spent on production management tasks by the AFPRO agreed with what the program office production element expected.

Conclusion

For Program B, the program office perceived where the AFPRO production element spent its time.

Program C

Findings

Table K.9 presents the data from the production elements assigned to Program C which related to the Hypothesis H3 test. Hypothesis H3 for Program C was rejected with a probability value of .0045. The rank order of the amount of time spent on production management tasks by the AFPRO agreed with what the program office production element expected.

Conclusion

For Program C, the program office perceived where the AFPRO production element spent its time.

Hypothesis H3 Summary of Three Programs

Findings

A summary of the statistical results for the three programs is presented in Table 3.3. Two of the three program office production elements' perceptions of the AFPRO rank order of time spent agreed with the AFPRO rank order of time spent.

Conclusion

The program office production elements tended to perceive where time was spent in the AFPRO production job.

Table 3.3
Hypothesis H3 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.23	1.68	Retain	.0465	Table K.7
B	.38	2.73	Reject	.0032	Table K.8
C	.37	2.61	Reject	.0045	Table K.9

Summary of Conclusions for the Time Ranking Hypotheses

A summary of results of testing all of the time related hypotheses is presented in Table 3.4.

Table 3.4
Summary of Time Ranking Tests

Hypothesis	Program	Tau	Z	Decision	Prob. Value	Source
H1	A	.31	2.24	Reject	.0125	Table K.1
	B	.30	2.12	Reject	.0170	Table K.2
	C	.22	1.58	Retain	.0571	Table K.3
H2	A	.27	1.95	Retain	.0256	Table K.4
	B	.53	3.80	Reject	.0001	Table K.5
	C	.15	1.09	Retain	.1379	Table K.6
H3	A	.23	1.68	Retain	.0465	Table K.7
	B	.38	2.73	Reject	.0032	Table K.8
	C	.37	2.61	Reject	.0045	Table K.9

Program office and AFPRO production elements' jobs tended to be related in terms of time spent on the production

management tasks. Hypothesis H1 test results indicated that two of the three programs had related time rank orders between the program office and the AFPRO.

Program office production elements tended to have a better perception of the AFPRO production job (Hypothesis H3) than the AFPRO production elements had of the program office production job (Hypothesis H2).

Hypothesis H4

There is no agreement in the rank order of the relative importance attached to production tasks by a program office and an AFPRO.

Program A

Findings

Table K.10 presents the data from the production elements assigned to Program A which related to the Hypothesis H4 test. Hypothesis H4 for Program A was rejected with a probability value of .0041. The program office and AFPRO production elements' rank orders of task importance indicated agreement.

Conclusion

For Program A, the AFPRO and program office production elements' jobs were similar in terms of importance given to tasks.

Program B

Findings

Table K.11 presents the data from the production

elements assigned to Program B which related to the Hypothesis H4 test. Hypothesis H4 for Program B was retained with a probability value of .3228. The program office and the AFPRO production elements had unrelated task importance rank orders.

Conclusion

For Program B, the program office and AFPRO production elements were dissimilar in terms of priorities assigned to the specific production management tasks.

Program C

Findings

Table K.12 presents the data from the production elements assigned to Program C which related to the Hypothesis H4 test. Hypothesis H4 for Program C was retained with a probability value of .2743. The rank orders of task importance by the AFPRO and the program office were unrelated.

Conclusion

For Program C, the program office and AFPRO production elements were dissimilar in terms of importance attached to the specific production management tasks.

Hypothesis H4 Summary of Three Programs

Findings

A summary of the statistical results for the three

programs is presented in Table 3.5. For two of the three programs, there was no relationship between the rank order of task importance by program office and AFPRO production elements.

Table 3.5

Hypothesis H4 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.37	2.64	Reject	.0041	Table K.10
B	.06	0.46	Retain	.3228	Table K.11
C	-.08	-0.60	Retain	.2743	Table K.12

Conclusion

The program office and AFPRO production element jobs tended to be dissimilar in terms of the rank order of task importance. The two offices had different priorities.

Hypothesis H5

> There is no agreement in the rank order of the relative importance attached to production tasks by a program office and the rank order of the relative importance an AFPRO thinks a program office attaches to tasks.

Program A

Findings

Table K.13 presents the data from the production elements assigned to Program A which related to the

Hypothesis H5 test. Hypothesis H5 for Program A was retained with a probability value of .0537. For Program A, the program office rank order of task importance did not agree with the AFPRO's perception of the program office rank order.

Conclusion

For Program A, the AFPRO did not perceive the program office task importance ranking. Without perception of the program office task importance profile, the AFPRO may lack a sound basis for establishing an effective working relationship with the program office.

Program B

Findings

Table K.14 presents the data from the production elements assigned to Program B which related to the Hypothesis H5 test. Hypothesis H5 for Program B was retained with a probability value of .0336. For Program B, the program office rank order of task importance did not agree with the AFPRO's perception of the program office rank order.

Conclusion

For Program B, the AFPRO did not perceive the program office task importance ranking. Without perception of the program office task importance profile, the

AFPRO may lack a sound basis for establishing an effective working relationship with the program office.

Program C

Findings

Table K.15 presents the data from the production elements assigned to Program C which related to the Hypothesis H5 test. Hypothesis H5 for Program C was retained with a probability value of .4761. For Program C, the program office rank order of task importance did not agree with the AFPRO's perception of the program office rank order.

Conclusion

For Program C, the AFPRO did not perceive the program office task importance ranking. Without perception of the program office task importance profile, the AFPRO may lack a sound basis for establishing an effective working relationship with the program office.

Hypothesis H5 Summary of Three Programs

Findings

A summary of the statistical results for the three programs is presented in Table 3.6. None of the AFPRO perceptions of the program office rankings of task importance were related to the rankings of task importance observed within their counterpart program offices.

Table 3.6

Hypothesis H5 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.22	1.61	Retain	.0537	Table K.13
B	.26	1.83	Retain	.0336	Table K.14
C	-.01	-0.06	Retain	.4761	Table K.15

Conclusion

AFPROs did not appear to perceive the program office task importance rankings. Without perception of program office task importance profiles, AFPROs may lack a sound basis for establishing an effective working relationship with program offices.

Hypothesis H6

> There is no agreement in the rank order of the relative importance attached to production tasks by an AFPRO and the rank order of the relative importance a program office thinks an AFPRO attaches to tasks.

Program A

Findings

Table K.16 presents the data from the production elements assigned to Program A which related to the Hypothesis H6 test. Hypothesis H6 for Program A was

retained with a probability value of .1492. For Program A, there was no agreement in the rank order of task importance observed in the AFPRO and the rank order perceived by the program office.

Conclusion

For Program A, the program office did not perceive the AFPRO task importance ranking. Without perception of the AFPRO task importance profile, the program office may lack a sound basis for establishing an effective working relationship with the AFPRO.

Program B

Findings

Table K.17 presents the data from the production elements assigned to Program B which related to the Hypothesis H6 test. Hypothesis H6 for Program B was retained with a probability value of .0455. For Program B, there was no agreement in the rank order of task importance observed in the AFPRO and the rank order perceived by the program office.

Conclusion

For Program B, the program office did not perceive the AFPRO task importance ranking. Without perception of the AFPRO task importance profile, the program office may lack a sound basis for establishing an effective working relationship with the AFPRO.

Program C

Findings

Table K.18 presents the data from the production elements assigned to Program C which related to the Hypothesis H6 test. Hypothesis H6 for Program C was retained with a probability value of .4681. For Program C, there was no agreement in the rank order of task importance observed in the AFPRO and the rank order perceived by the program office.

Conclusion

For Program C, the program office did not perceive the AFPRO task importance ranking. Without perception of the AFPRO task importance profile, the program office may lack a sound basis for establishing an effective working relationship with the AFPRO.

Hypothesis H6 Summary of Three Programs

Findings

A summary of the statistical results for the three programs is presented in Table 3.7. Of the three program office production elements studied, none of their perceptions of the AFPRO task importance rankings were related to the rankings of task importance observed within their counterpart AFPROs.

Table 3.7

Hypothesis H6 Summary of Three Programs

Program	Tau	Z	Decision	Prob. Value	Source
A	.15	1.04	Retain	.1492	Table K.16
B	.24	1.69	Retain	.0455	Table K.17
C	.01	.08	Retain	.4681	Table K.18

Conclusion

Program offices did not appear to perceive AFPRO task importance rankings. Without perception of AFPRO task importance profiles, the program offices may lack a sound basis for establishing an effective working relationships with their counterpart AFPROs.

Summary of Task Importance Rankings

Findings

Table 3.8 presents the summary data related to the hypothesis testing of task importance rankings. A comparison of findings and supporting data relating to the subject of task importance ratings shows that only one of the hypotheses was rejected. The rank order of importance attached to production management tasks were unrelated between program office and AFPRO production elements in terms of direct comparison of observed values and mutual perceptions of task importance rankings.

Table 3.8

Summary of Task Importance Ranking Tests

Hypothesis	Program	Tau	Z	Decision	Prob. Value	Source
H4	A	.37	2.64	Reject	.0041	Table K.10
	B	.06	0.46	Retain	.3228	Table K.11
	C	-.08	-0.60	Retain	.2743	Table K.12
H5	A	.22	1.61	Retain	.0537	Table K.13
	B	.26	1.83	Retain	.0336	Table K.14
	C	-.01	-0.06	Retain	.4761	Table K.15
H6	A	.15	1.04	Retain	.1492	Table K.16
	B	.24	1.69	Retain	.0455	Table K.17
	C	.01	0.08	Retain	.4681	Table K.18

Conclusions

The production element jobs of program offices and AFPROs were unrelated in terms of the importance that they attach to specific production management tasks.

Program offices and AFPROs may not mutually perceive each other's task importance profiles.

In terms of relative task importance, there may not be a sound basis for an effective working relationship between program office and AFPRO production elements.

Program Results and Findings

The previous section has analyzed the results and findings of the study from the frame of reference of the

relative amount of time spent on and the relative importance of production management tasks. Individual hypothesis tests of the source data were used to guide the identification of findings and the drawing of conclusions. Each successive step led to a statement of conclusions relating to the respective production elements either in terms of time or importance.

This section presents summaries of data developed in the previous section arrayed by the programs sampled in the study.

Program A

Data Presentation

Table 3.9 presents the summary data pertinent to the hypothesis tests for Program A production elements.

Table 3.9

Program A Hypothesis Test Summary

Hypo-thesis	Tau	Z	Decision	Prob. Value	Source
H1	.31	2.24	Reject	.0125	Table K.1
H2	.27	1.95	Retain	.0256	Table K.4
H3	.23	1.68	Retain	.0465	Table K.7
H4	.37	2.64	Reject	.0041	Table K.10
H5	.22	1.61	Retain	.0537	Table K.13
H6	.15	1.04	Retain	.1492	Table K.16

Findings

For Program A, the rank order of task time and task importance were in agreement. Hypothesis H1 and Hypothesis H4 were rejected.

For Program A, the mutual perceptions by the program office and the AFPRO of each other's rank order of time spent or of the importance of specific production management tasks were not in agreement. Hypothesis H2, Hypothesis H3, Hypothesis H5, and Hypothesis H6 were all retained.

Conclusions for Program A

The production element jobs of the program office and the AFPRO were similar in terms of time spent on and importance of production management tasks.

Neither the program office nor the AFPRO production elements perceived the other's job profiles for time or importance.

Both production elements appeared to be doing the same jobs with the same level of importance attached, without recognizing what the other office was doing.

Program B

Data Presentation

Table 3.10 presents the summary data pertinent to the hypothesis tests for Program B production elements.

Table 3.10

Program B Hypothesis Test Summary

Hypo-thesis	Tau	Z	Decision	Prob. Value	Source
H1	.30	2.12	Reject	.0170	Table K.2
H2	.53	3.80	Reject	.0001	Table K.5
H3	.38	2.73	Reject	.0032	Table K.8
H4	.06	0.46	Retain	.3228	Table K.11
H5	.26	1.83	Retain	.0336	Table K.14
H6	.24	1.69	Retain	.0455	Table K.17

Findings

Hypotheses H1, H2 and H3 were rejected. The program office and AFPRO production elements' rank orders of time spent were in agreement as was their mutual perception of each others' time expenditure profile.

Hypotheses H4, H5 and H6 were retained. Neither the rank order of task importance by each of the production elements nor their mutual perception of each other's task importance profiles were in agreement.

Conclusions for Program B

The production element jobs of the program office and AFPRO were similar in terms of time spent on production management tasks. Each element perceived the other's time expenditure profile.

The production element jobs of the program office

and AFPRO were dissimilar in terms of a task importance profile. Neither element perceived the other's task importance profile.

The two production elements worked on the same tasks, but had different importance rankings attached to the tasks.

Program C

Data Presentation

Table 3.11 presents summary data pertinent to the hypothesis tests for Program C.

Table 3.11

Program C Hypothesis Test Summary

Hypothesis	Tau	Z	Decision	Prob. Value	Source
H1	.22	1.58	Retain	.0571	Table K.3
H2	.15	1.09	Retain	.1379	Table K.6
H3	.37	2.61	Reject	.0045	Table K.9
H4	-.08	-0.60	Retain	.2743	Table K.12
H5	-.01	-0.06	Retain	.4761	Table K.15
H6	.01	0.08	Retain	.4681	Table K.18

Findings

Hypothesis H1 was retained. There was no agreement between the AFPRO and program office rank order of time spent on production management tasks.

Hypothesis H2 was retained. There was no agreement in the rank order of the program office task time and the AFPRO perception of program office task time.

Hypothesis H3 was rejected. There was agreement in the rank order of the AFPRO task time and the program office perception of AFPRO task time.

Hypotheses H4, H5 and H6 were retained. There was no agreement in the task importance rankings of the program office and AFPRO, nor was there agreement in the mutual perceptions of task importance profiles between the two production elements.

Conclusions for Program C

The two production element jobs were dissimilar in terms of time spent on specific production management tasks and the importance profile attached to those tasks.

With the exception that the program office perceived the AFPRO task time distribution, neither production element perceived the other's job profile.

Patterns of Responses

The mixed results from tests of hypotheses H1 through H6 prompted a more detailed examination of individual task responses. This examination attempted to identify areas of agreement or disagreement which might be attributable to specific tasks. Two approaches were used. Patterns of time or importance agreement were sought by

testing for concordance. Patterns of disagreement were sought by examining the differences in rankings between program offices and AFPROs.

Concordance

The supporting null hypotheses S1, S2, S3 and S4 were tested by Kendall's coefficient of concordance (11:229) to determine if overall patterns of time or importance existed among program offices or among AFPROs. Three of the four supporting null hypotheses were rejected, indicating patterns of agreement. Only Hypothesis S4 was retained, indicating no pattern of task importance among AFPROs. The results of the tests of these hypotheses are presented in the following sections.

Program Office Time Ranking

An overall pattern of agreement on time spent existed among the program offices for Programs A, B and C. From the formula presented in Chapter II, W was .63. The corresponding Chi-Square sample value was 47.25 which, when compared to a critical value of 37.7 for 25 degrees of freedom, led to rejection of Null Hypothesis S1. The sum of the individual program office rankings of responses to Question 1 can therefore be used as an indication of the order of time spent on the various tasks. A summary of this combined ranking is presented in Table 3.12. The results of this ranking cannot be literally taken to mean,

for example, that the sixth-ranked task consumes more time than the seventh-ranked task. Table 3.12 contains a number of ties. The results do indicate, however, that tasks near the top of the rank order consume more time than those near the bottom of the rank order.

Table 3.12

Combined Time and Importance Rankings for Patterns of Agreement

Task Description	Program Office Combined Time Ranking	Program Office Combined Importance Ranking	AFPRO Combined Time Ranking
Govt. Prog. Documentation	17.0	25.0	23.0
Production Feasibility	7.0	7.5	11.5
Milestones/Master Sched.	9.0	12.0	21.0
Mul/Priorities	18.0	20.0	19.0
Memorandum of Agreement	5.5	2.0	2.0
Contract Requirements	12.0	21.0	15.0
Govt. Furn. Property	1.0	2.0	16.5
Preaward Surveys	24.0	22.0	25.0
Source Selection	25.0	19.0	22.0
Contractor Prog. Doc.	2.0	7.5	11.5
Proposal Evaluation	8.0	2.0	6.5
Producibility	13.0	14.5	14.0
Production Risk Assess.	5.5	4.5	9.0
Mfg. Methods/Technology	16.0	18.0	10.0
Production Readiness	10.5	14.5	24.0
ECP Evaluation	3.5	7.5	4.0
Surveillance/Monitoring	3.5	7.5	1.0
Mfg. Mgmt. Sys/Ops Eval.	21.0	16.5	3.0
Special Surveys/Audits	19.5	23.0	8.0
Prod. Assessment Reports	23.0	24.0	5.0
Strike Information	19.5	16.5	18.0
Intercommand Support	10.5	11.0	13.0
Post Award Orientation	26.0	26.0	26.0
Cost Expenditure Eval.	14.0	13.0	6.5
Make or Buy Eval.	22.0	10.0	20.0
Expediting/Rescheduling	15.0	4.5	16.5

Program Office Importance Ranking

An overall pattern of agreement on task importance also existed among the program offices for Programs A, B and C. W, in this case, was .51 and the corresponding Chi-Square sample value was 38.25. Comparison with the same critical Chi-Square value of 37.7 led to rejection of Null Hypothesis S2. The combined program office rankings of responses to Question 2 is presented in Table 3.12. This ranking by importance may be interpreted as the general order of task importance among the three program offices.

AFPRO Time Ranking

The AFPROs for Programs A, B and C generally agreed on the order of tasks according to time spent. The value of W was .68 and the corresponding Chi-Square sample value was 51, causing rejection of Null Hypothesis S3. The combined AFPRO ranking of responses to Question 1 is provided in Table 3.12 and may be interpreted as the general order of tasks by time among the three AFPROs.

AFPRO Importance Rankings

There was no significant agreement among AFPROs on task importance. Accordingly, no attempt was made to combine their individual rankings. W, in the statistical test, was .45 and the Chi-Square sample value was 33.75. Comparison with the critical Chi-Square value of 37.7 failed to support rejection of Null Hypothesis S4.

Summary of Concordance Test Results

Table 3.12 provides a basis for comparing time and importance rank agreements of the tasks included in the study. The reader is cautioned to limit inference from small differences in ranking.

Task Differences

The previous section of this chapter have presented the findings of the study as they relate to the stated hypotheses, to the particular programs and to the types of production elements (program office or AFPRO). A further look at findings related to each production management task is presented in Appendix M. Particular attention is given to tasks that met the significant difference criteria described in Appendix L or exhibited patterns considered worthy of note.

Time Rankings

Program Offices consistently ranked time spent on government furnished property, contractor program documentation and production readiness higher than their AFPRO counterparts.

AFPROs consistently ranked time spent on manufacturing management systems analysis, memorandum of agreement, special surveys and production assessment reports higher than their program office counterparts.

Importance Rankings

Program offices consistently ranked the importance of government furnished property, make or buy and expediting/special scheduling higher than their AFPRO counterparts.

AFPROs consistently ranked the importance of manufacturing management system analysis and special surveys higher than their program office counterparts.

Summary of Findings and Conclusions

This chapter has presented the findings of the study. Six hypotheses were tested for each of three programs. The resulting 18 hypothesis test results and conclusions from the results were presented by hypothesis. Summaries were presented by hypothesis, and by production task.

Chapter IV presents summary conclusions and recommendations related to objectives of the study.

CHAPTER IV

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The summary conclusions in this chapter relate to the objectives of the study presented in Chapter I. Those objectives are reviewed here. The summary conclusions are supported by the results and findings presented in Chapter III. Recommendations are presented for actions based upon the study findings and for application of the study methodology. Relationships between the study objectives, research hypotheses, and null hypotheses are shown in Figure 4.1.

Conclusions

Production Tasks Performed

The first two objectives of the study were to determine the production management tasks performed by program office and AFPRO production elements. The initial step to accomplish these objectives was a review of Air Force production management directives to identify those tasks applicable to program offices and AFPROs. A resulting task list was used as the basis for determining the relative amount of time that each production element spent performing the task and how much importance was attached to the task

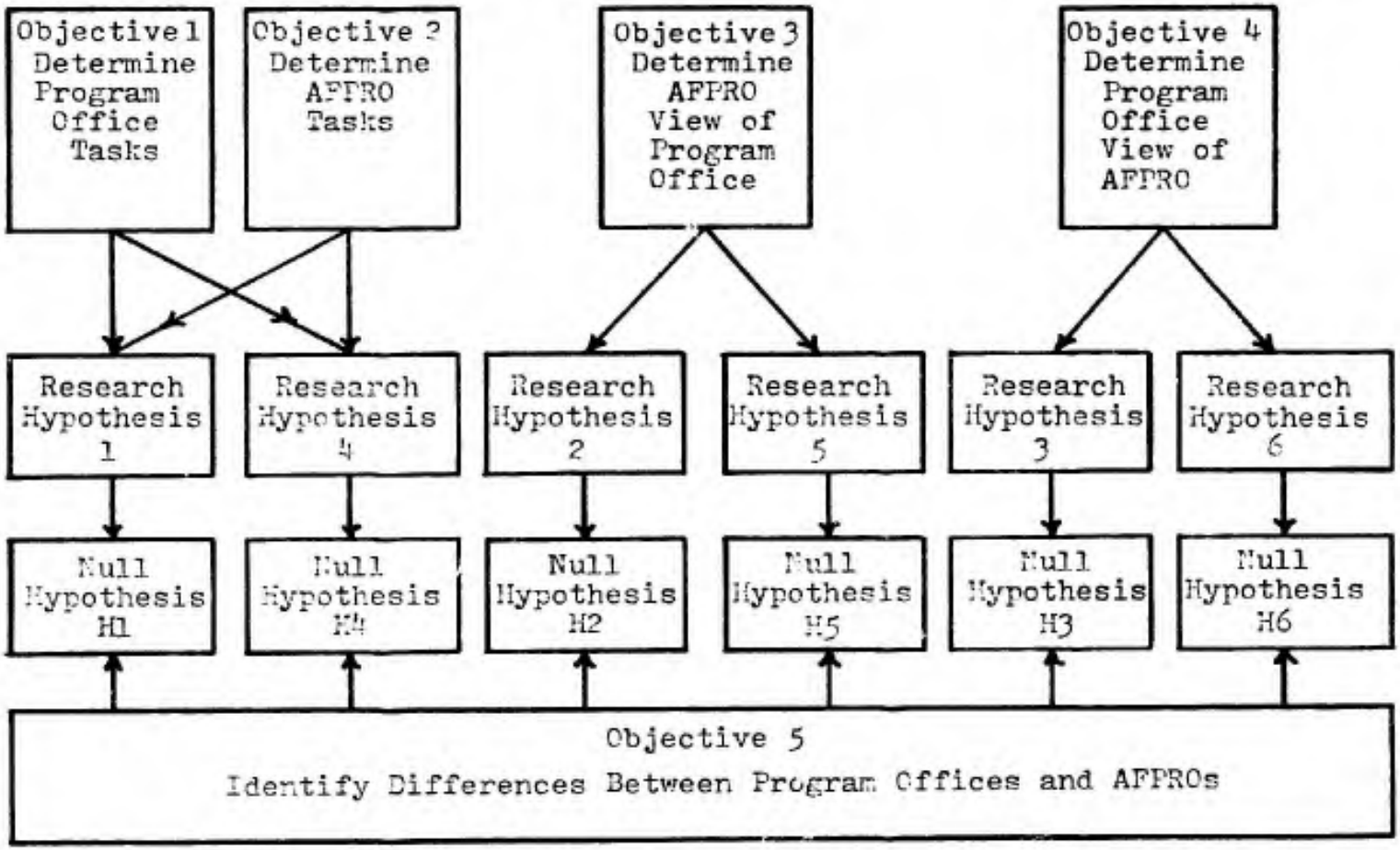

Figure 4.1

Relationships Between Objectives and Hypotheses

by the organization. Responses from the production elements indicated which production tasks were performed by the organizations. In order to evaluate one aspect of similarity of the two types of production elements, the following research hypothesis was formulated:

Research Hypothesis 1

> There is no difference between the production management tasks performed in a program office and the production management tasks performed in an AFPRO.

The research hypothesis was supported. For two of the three programs sampled, the relative time rankings of production management tasks were related. The program office and AFPRO production jobs tended to be similar in terms of time spent on particular tasks.

Another indicator of similarity between the two types of production elements was a comparison of the relative amount of importance attached to tasks. The following research hypothesis was formulated to evaluate this aspect of job similarity:

Research Hypothesis 4

> There is no difference between the production management tasks considered important by the production element of an AFPRO and the tasks considered important by the production element of a program office.

The research hypothesis was not supported. For two of the three programs sampled, the relative rankings of

importance attached to the production management tasks were not related. The program office and AFPRO production jobs tended to be different in terms of importance attached to particular tasks.

AFPRO View of Program Office

The third objective of the study was to determine how AFPRO production management personnel view the task structure of program office production elements. AFPRO opinions of the program office production element task structure, in terms of time spent and importance, were compared to the program offices' internal view of the task structure. The following research hypothesis was formulated concerning the AFPROs' view of program office task time rankings compared to the rankings provided by the program office:

Research Hypothesis 2

> There is no difference between the production management tasks performed in a program office and the production management tasks which AFPRO production elements believe are performed in a program office.

The research hypothesis was not supported. For two of the three programs sampled, the relative rankings of the AFPROs' internal view of task time were not related. The AFPRO production elements tended to lack perception of the program office production job.

A second indicator of the AFPROs' view of the program

office task structure was formulated to address the following research hypothesis:

Research Hypothesis 5

> There is no difference between the production management tasks considered important by a program office and the production management tasks which AFPRO production elements believe to be important to a program office.

The research hypothesis was not supported. For each of the three programs sampled, the relative rankings of the AFPRO's opinions of the program office production task importance profile was not related to the program office's internal view of the task importance structure. The AFPRO production elements tended to lack perception of the program office production job in terms of task importance.

Program Office View of AFPRO

The fourth objective of the study was to determine how program office production management personnel view the task structure of AFPRO production elements. Program office opinions of the AFPRO production element task structure, in terms of time spent and importance, were compared to the AFPRO internal view of the task structure. The research hypothesis formulated to partially evaluate how the program office viewed the AFPRO task structure was:

Research Hypothesis 3

There is no difference between the production management tasks performed in an AFPRO and the production management tasks which program office production elements believe are performed in an AFPRO.

This research hypothesis was supported. For two of the three programs sampled, the relative rankings of the program offices' view of AFPRO task time and the AFPROs' internal view of task time were related. The program office production elements tended to have a good perception of the AFPRO production job in terms of time spent on tasks.

A second indicator of the program offices' view of the AFPRO task structure was formulated to address the following research hypothesis:

Research Hypothesis 6

There is no difference between the production management tasks considered important by an AFPRO and the production management tasks which program office production elements believe to be important to an AFPRO.

This research hypothesis was not supported. For each of the programs sampled, the relative importance rankings of the program offices' opinions of the AFPRO task importance profile was not related to the AFPROs' internal views of the task importance structure. The program office production elements tended to lack perception of the AFPRO production job in terms of task importance.

Differences Between AFPRO and Program Office

The fifth objective of the study was to identify the differences in the tasks performed in the two organizations.

The study did not reveal objective evidence to clearly distinguish between the tasks performed by the two organizations. However, the nature of the consistent differences between program office and AFPRO production elements indicated that the program office had an orientation toward "hardware" being acquired and the AFPROs had an orientation toward contractor systems to produce the "hardware".

Inconsistencies of importance profiles existed on tasks where significant differences were observed. The conclusion may be that the task importance profiles vary by production element and program environment.

During the course of the study, the researchers frequently encountered situations where the respondent would provide normative responses on tasks that, based upon the background of the researchers, were not applicable to the phase of the program or the responsibility of the organization. Respondents often "twisted" terms to "fit" into the situation, thereby avoiding a <u>not applicable</u> or <u>none</u> response. For example, the terms <u>preaward survey</u>, <u>source selection</u> and <u>postaward orientation</u> were frequently "framed" by respondents to be applicable to subcontracting actions. Whether this phenomena was indicative of a weakness of the study methodology or lack of knowledge by

the respondents cannot be determined. A similar situation occurred with the responses concerning government furnished property and manufacturing management systems analysis. These responses indicated strong "value transference", where the response might be interpreted as "This is so much a part of my job here that it would be an equal part of my job there."

The summary conclusions, for programs sampled, were: (a) program offices and AFPRO production element jobs tended to be related in terms of time spent on particular tasks, but unrelated in terms of task priority, (b) AFPRO production elements tended to lack perception of the program office production job, and (c) program offices tended to perceive the task time expenditures by the AFPROs, but not the task importance profile.

Study Implications

A presentation of the conclusions of research opens the question of the meaning of those conclusions. An answer to that question requires a review of the events leading to the conclusions.

Early in the methodology section it was stated that the study would not pretend to establish what the "correct" or "right" rank order of task time or importance "should be". The establishment of the "should be" is more appropriately the function of responsible managers or policy makers. This study has only reported what was observed by

the researchers to exist on three programs. It is left to the managers of Air Force production/manufacturing operation elements to use, as necessary, the empirical evidence gathered by this study in the value judgments they alone should make.

In several instances, it was concluded that an agreement (i.e., a relationship of rank orders) did or did not exist. The implications of those statements are briefly discussed. Those conclusions were based upon statistical test results only. The conclusions, regarding the agreements of rank order have said that at a specified level of confidence (there should be no more than a five percent chance of being wrong) a relationship did or did not exist. There has been no attempt to interpret the "strength" of the relationship, i.e., whether Tau was "good" or "bad". Again, the researchers feel that the value judgment as to what the value of Tau "should be" is more appropriately the responsibility of management or policy personnel.

Theoretically, the relationship between the two organizations, in terms of Tau, can be as "strong" as +1.00 for a "perfect" agreement of rank order for a direct relationship. Tau can also be as strong as -1.00 for a "perfect" disagreement of rank order for an inverse relationship. A value for Tau between -1.00 and +1.00 represents the amount of disarray that exists between the two organizations. Again, for the researchers to pass judgment on

the appropriateness of the Tau value observed would be a direct infringement of the prerogatives of responsible management or policy making personnel.

It should be pointed out that if management expects program office and AFTRO task structures to be directly related, Tau should be positive. If the task structures are to be strongly related, Tau should approach +1.00. Conversely, if the two organizations are to have an inversely related task structure, Tau should be negative. If there is to be a strong inverse relationship, Tau should approach -1.00. Three elements of responsibility rest upon the shoulders of management: (a) establish the "should be" task order for each organization, (b) determine the direction of relationship, i.e., positive or negative, and (c) determine the strength of the relationship, i.e., the value of Tau or a range of acceptable limits around Tau.

Once management has established the "acceptable" level and the sign of Tau, the meaning and implication of this study can be properly interpreted. The researchers feel confident, however, that management expects each of the organizations to perceive the other organization's task structure in terms of at least what is considered important and where the time is spent. In this regard, recall that with the exception of the program office perception of AFTRO time expenditure rankings, there was generally low mutual perception of the other organizations' role, and Tau was relatively small. Mutual understanding

is believed to contribute to the establishment of an effective working relationship between the program office and AFPRO production elements. With this understanding, the two production elements, in terms of comparing job operations, could have a Tau ranging from -1.00 to 1.00, but would be able to develop relationships that are complementary and maximize mutual contribution to the production management objectives.

This discourse has led to the point of addressing the question of the meaning of the conclusions. This question will be addressed more in terms of questions than answers. The issues that the researchers felt emerged during the study were:

1. Program office and AFPRO production elements tended to have the same time related task structure. Does management intend program office and AFPRO production jobs to be similarly structured?

2. Program office and AFPRO production elements tended to have a different set of priorities. Can there be an effective working relationship between the two organizations if they work on the same tasks, but have underlying conflicts of interest due to different priority structures?

3. With the exception of the program office perception of the AFPRO task time profile, neither organization perceived the other's role. Can effective working relationships be established while this condition exists?

What are the implications for structuring training and education programs for production management personnel?

4. Collective assessments of program office task time and importance structures and AFPRO task time structure showed that they were related. The collective assessment of AFPRO task importance structures showed they were not related. Does this mean that generally the same tasks are worked by all the production elements, but there was a lack of understanding within AFPROs as to why the tasks were performed?

5. This study did not attempt to "judge" or establish a "correct" order of task importance or task time. How do the observed values conform to criteria established by management?

These are questions raised by the study conclusions. Having answered a question with a series of questions, a set of recommendations with regard to the study is now presented.

Recommendations

Three ASD programs do not present conclusive evidence that the trends of the findings can be inferred to apply to all ASD programs or to programs other than those that are the responsibility of ASD. The methodology appears to have been validated and the technique can be effectively and efficiently replicated. Therefore, in

order to establish a basis for confident inference, it is recommended that the study be replicated:

1. With additional ASD programs and AFPROs to establish measures of central tendency and variance for ASD programs.

2. With ESD and SAMSO programs administered by AFPROs to establish measures of central tendency and variance within AFSC.

3. With AFSC programs and DCAS administered programs to define the production management relationships in an interagency working environment.

The study has made no attempt to establish a "should be" set of standards for comparison with what was observed. In order to establish a normative base for evaluation of this study and future study results, it is recommended:

4. That a joint team from Headquarters AFSC, ASD, and AFCMD establish "normative" patterns of task time and importance for program office and AFPRO production elements, and that those patterns be evaluated using the methodology of this study.

Since this study has identified, on three programs, production management tasks that significantly contribute to disagreement in practice or understanding, it is recommended that:

5. Headquarters AFSC evaluate the nature of those tasks in view of AFSC policy regarding desired program office and AFPRO relationships, and

6. construct a model memorandum of agreement for program office and AFPRO use that specifically defines the degree of responsibility for the effectuation of those tasks that contribute significantly to mutual disagreement of time worth or importance.

The researchers feel that the concept, methodology, and procedures of the study have been validated. With that in mind, it is recommended that the study methodology be adapted for use as a management tool to evaluate the effectuation of production management responsibilities between program offices and AFPROs against "standards" established by management.

Perspective

The objectives of this production management study were accomplished. Although the results of the study cannot strictly be generalized beyond the programs studied it does represent a starting point for understanding one aspect of acquisition production management. The whole scope of production management and the broader integration of production management into systems acquisition management have been beyond this study. Chapter V presents corollary observations and recommendations of this study which relate to the broader perspective of systems acquisition management.

CHAPTER V

OBSERVATIONS FOR FURTHER RESEARCH

This research addressed a specific problem: the working relationship between the production elements of a program office and an AFPRO supporting the same weapon system program. A number of observations were made during the research process. Those observations bearing directly on the problem addressed have been included in the previous chapters. Other observations concern the weapon system acquisition process, but are beyond the scope of the problem addressed. The observations beyond the problem scope are presented here in the hope this chapter will serve as a stimulus for further research into weapon system acquisition management.

Eight observations are presented, drawn from published literature and interview records in combination with the researchers' experience. The discussion of each observation considers implications of the situation observed and offers a recommendation for research.

Specialization

Observations

Interview comments from program offices and from AFPROs indicated a high degree of specialization of certain

CHAPTER V

OBSERVATIONS FOR FURTHER RESEARCH

This research addressed a specific problem: the working relationship between the production elements of a program office and an AFPRO supporting the same weapon system program. A number of observations were made during the research process. Those observations bearing directly on the problem addressed have been included in the previous chapters. Other observations concern the weapon system acquisition process, but are beyond the scope of the problem addressed. The observations beyond the problem scope are presented here in the hope this chapter will serve as a stimulus for further research into weapon system acquisition management.

Eight observations are presented, drawn from published literature and interview records in combination with the researchers' experience. The discussion of each observation considers implications of the situation observed and offers a recommendation for research.

Specialization

Observations

Interview comments from program offices and from AFPROs indicated a high degree of specialization of certain

tasks. In some instances, a respondent in a program office or an AFPRO expressed no opinion about the performance of a task in his own production element, while the second respondent in the same production element appeared deeply involved with the task. Complete lack of knowledge about particular tasks may have contributed to the lack of perception of the counterpart production element.

A second form of specialization was encountered only in the AFPROs. Two of the three programs studied were operated under the Deputy Air Force Plant Representative (DAFPR) concept. Under this concept, a group of functional specialists within the AFPRO are "dedicated" to a program. Other "non-dedicated" functional specialists serve the AFPRO's broader mission of contract management for all defense contracts in the prime contractor's plant. The non-dedicated specialists more often indicated a lack of knowledge of the program office production element than did the DAFPR specialists.

The researchers could not judge the degree of task specialization existing in the production elements studied. Has the DAFPR concept contributed to increased specialization? Is specialization a characteristic of all government production management elements, or only of those studied? Is production task specialization beneficial or detrimental to management of a weapon system? If beneficial, should specialization be recognized in training of production specialists?

Recommendation

The researchers recommend a study to investigate the degree and extent of production task specialization in government production management elements.

Manpower Versus Task Structure

Observations

Air Force production management policy for the 1970s has stressed the "front end" tasks for a weapon system program. Emphasis is placed on tasks leading up to the decision to produce. A review of the production management tasks in AFSC Manual 84-3 (15: Attachment 1) shows tasks expected through the Validation and Full-Scale Development phases which do not appear for the Production phase.

The traditional pattern in manning of a production element is one of few production specialists in the early program phases, followed by a "build up" of the number of specialists when the production decision has been made.

It appears that current production policy and the program manning policy are opposed, if the number of tasks and numbers of people are used as indicators of workload. This concept is illustrated in Figure 5.1.

If the number of tasks and numbers of people are not accurate indicators, Figure 5.1 does not represent the

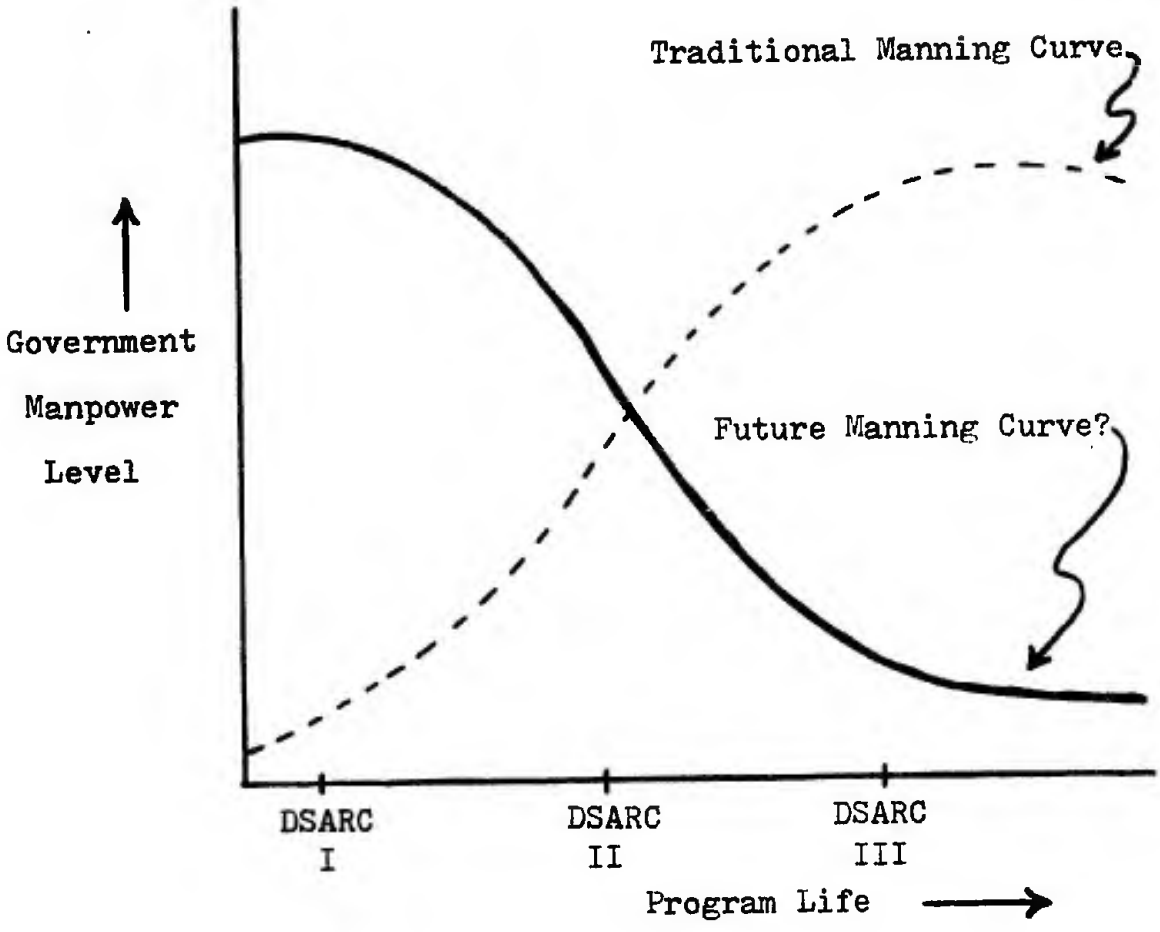

Figure 5.1

Comparison of Manning Concepts

production management situation. An alternative explanation is that the production job in a production element changes content with different phases of the weapon system life cycle. If this explanation holds, the skills needed in the various phases may be different. Are there separate analytical and information gathering skills needed in production management? If specialists are trained differently for the "front end" tasks, should these specialists be moved to programs entering phases where their skills are needed? Should there be a separate "preproduction" specialty?

Recommendation

The researchers recommend study of the skills and manpower levels necessary to perform each of the various production tasks identified. Recognition of skill differences needed, if considered desirable, should be part of a properly constituted and conducted educational program for training of production management specialists.

Tasks, Functions, and Missions

Observations

Companion observations to those concerning Specialization are those related to a

> ". . . cascade of explanatory information, in terms of increasing detail, from summary mission statement down through a few major functions to the detailed tasks . . . grouped by, and identified to, a specific function [24]."

At the onset of the study, the researchers were unable to find a "cascade" upon which task discrimination between program office and contract administration office was readily apparent. During the conduct of the study, the researchers encountered response from shifting frames of reference (see Differences Between AFPRO and Program Office, page 81). It is the opinion of the researchers that such a cascade would have greatly aided the structure of the study and provided a clear distinction between program office and AFPRO major responsibilities for a given production management task.

Recommendation

The researchers recommend a study to investigate and classify (a) major responsibilities and functions, and (b) tasks which properly should be assigned to the AFPRO or program office production elements.

Communication Patterns

Observations

This study examined the interface between the production elements of program offices and AFPROs. The scale of measurement for the data was ordinal. No conclusions could be made about the amount of time spent on particular tasks. Further, no attempt was made to find out the amount of time either production element spent at this "functional counterpart" interface. The research did not attempt to

find out with what organizations the production elements communicated. The researchers' experience indicated that staff elements and other program office or AFPRO functions are involved. Communication in program office production elements includes other buying activities concerning government furnished property. AFPROs communicate with other program offices about their respective programs. Does the program office/AFPRO production functional interface represent a very small part of the total job in either the program office or the AFPRO?

Communication blocks between functional counterparts may exist because of direct formal links. The channel for communicating AFPRO evaluations of ECPs is usually via the Administrative Contracting Officer (ACO). AFPRO production elements in the study consistently indicated a higher level of effort on ECP evaluation than the program office production elements expected. Does the existence of a formal communication channel block communication with functional counterparts?

Recommendation

A study should be conducted to determine with which organizations production elements communicate, for what purposes they communicate, and how much time is spent in each communication link.

Task Content

Observations

Several respondents in the study shifted their frame of reference to define a task so that they could give a positive response. This raised the question of whether the content of a particular task might differ among production elements. The task description presented to each respondent was identical. Did expediting mean the same thing in AFPRO A and Program Office A? Did it mean the same thing in AFPRO A and AFPRO B? Would content analysis (2:48) of tasks aid in explaining differences? Chase and Aquilano (1:424) have described terms such as monitoring, controlling and adjusting as too imprecise for distinquishing among similar tasks.

Recommendation

The researchers recommend a study to describe the content of similarly titled tasks within different production elements.

The Illusion of Impotence

Observations

Traditional arguments and regulatory "requirements" have described the contract administration office as the management link between a program office and a contractor, and as the "eyes and ears" of the program office.

This concept appears valid up to a point. Topics with precedence implications in the mainstream of contract administration issues need to be treated with professional formal discipline. This formal treatment may prevent "constructive changes" and the undermining of organizational roles. However, formal treatment has evolved from the original intent to a means of helping the contract administration office (CAO) "save face" with the contractor.

Program offices are "required" to clear with the CAO prior to engaging with the contractor to avoid creating an illusion of impotence concerning the CAO. There is no "requirement" for the CAO to clear with a program office prior to engaging with the contractor.

Considering such factors as (a) the evolving ethics of BLUELINE (18:2) communications in program management; (b) the time value of information; (c) the apparent nature of information needs of a program office; and (d) potential impact of CAO management findings of "deficiencies" within a contractor's management system, the researchers see new issues in systems acquisition management. Is it time to reevaluate the written policy requiring all program office functional interfaces with contractors to "funnel" through the CAO? With the increasing complexity of issues facing systems acquisition managers, is it time to reevaluate policy and require the CAO to coordinate with the program office prior to engaging with the contractor on substantive matters?

Recommendation

A study should be made of direct communications between program offices and contractors, and between contract administration offices and contractors, to evaluate the benefits and disadvantages of using the BLUELINE communication concept in contract management.

Program Office Perception

Observations

The researchers have concluded that the program office production elements tended to have a better perception of the AFPRO production management job as performed than the AFPRO perception of the program office job. Why was this the case? Is it due to a migration of production managers from AFPROs to program office? Is it due to the program office becoming an information sink, i.e., information flowing into the program office from the AFPRO but not flowing to the AFPRO from the program office? Is it due to more information exchange among program offices? Are AFPRO production elements isolated?

Recommendation

The researchers recommend a study to determine why AFPRO production element personnel do not appear to have perception of the program office production job.

Application of Study Methodology

Observation

Functional disciplines other than production management, e.g., quality assurance, engineering, configuration management, pricing, contract administration (administration/procuring contracting officers), are expected to establish close working relationships between program office and contract administration office counterparts. The researchers envision, by revising the task list, that the study could be replicated to determine the degree of relationships existing in other functional disciplines.

Recommendation

The researchers recommend that the methodology of this study be used to investigate program office and contract administration office relationships in other functional disciplines.

Final Comment

The observations and recommendations in this chapter are intended as food for thought. The researchers have not intended to advocate either side of issues contained in the topics discussed, and do not advocate blind adherence to an opinion without reasonable support. Further research is advocated in order to support reasoned opinion.

APPENDICES

APPENDIX A

INTERVIEW INTRODUCTION

Figure A.1 contains the wording of the interview introduction.

I am attending a graduate course in logistics management at the Air Force Institute of Technology. As a thesis project, two of us are studying production management tasks performed by SPOs and AFPROs.

The purpose of the study is to identify those production management tasks performed in SPOs, those tasks performed in AFPROs, and the importance attached to the various tasks. We need help in determining which tasks are performed by whom and which are considered important.

This interview consists of questions which we will use to measure your opinion and those of other managers. Responses will not be identified to any individual. The study will present a summary of opinions from all managers interviewed. There are no right or wrong answers. We solicit only your opinion.

The questions relate to a list of tasks compiled from a variety of sources. We hope the list is representative of the tasks actually performed. In the event that it is not, we welcome your suggestions about omitted tasks. Some tasks on the list may not apply to your production office.

Four questions will be asked about each task. The questions are constructed to scale values. I will give you a number of responses from which you can choose a response that most closely represents your opinion. Again, there is no right or wrong answer.

The set of questions will be repeated for each task.

Figure A.1
Interview Introduction

APPENDIX B

PRODUCTION MANAGEMENT TASKS STUDIED

The following 26 task descriptions were used as the representative production management tasks about which this study was designed. Each task is identified by an arbitrarily assigned number, the precise task description presented to each respondent, and an abbreviated description. The abbreviations correspond to those used in various tables, particularly in Appendix K. Each respondent was shown only the task number and the corresponding task description, one task to a page in a notebook. The respondent therefore had only one task description at a time before him.

The 26 tasks studied were:

1. Prepare and provide input to the production management portion of government system program documentation (GOVT. PROG. DOCUMENTATION).
2. Prepare and review production feasibility assessments for the program and coordinate contractual requirements for production feasibility assessments (PRODUCTION FEASIBILITY).
3. Review and approve integrated production plans and identify key production milestones. Provide production schedules and milestone dates for the program Master Schedule (MILESTONES/MASTER SCHED.).

4. Coordinate inputs to the DOD Master Urgency List, Industrial Priority Rating, and DOD materiel allocations (MUL/PRIORITIES).
5. Establish and maintain formal interfaces and working relationships between the production elements of the program office and the contract administration office, e.g., Memorandum of Agreement, Letters of Instruction or Delegation, joint meetings (MEMORANDUM OF AGREEMENT).
6. Prepare production requirements to be included as contractual documentation (CONTRACT REQUIREMENTS).
7. Coordinate the management of Government Furnished Property and services for the contractual phase of the program (GOVT. FURN. PROPERTY).
8. Plan, accomplish, and/or coordinate Preaward survey activities for the program (PREAWARD SURVEYS).
9. Define source selection production criteria and/or accomplish source selection evaluation responsibilities for production subjects (SOURCE SELECTION).
10. Review and approve the production aspects of contractor prepared program documentation (CONTRACTOR PROG. DOC.).
11. Provide technical assistance in the evaluation and negotiation of the production portion of contractor proposals (PROPOSAL EVALUATION).
12. Review, approve, and coordinate the technical and contractual aspects of producibility criteria, analyses, and demonstrations (PRODUCIBILITY).

13. Coordinate the activities to identify production risks and review actions taken to reduce production risks on the program (PRODUCTION RISK ASSESS.).
14. Review the selection and application of manufacturing methods, processes, and technology (MFG. METHODS/ TECHNOLOGY).
15. Plan, conduct, and/or review the results of the Production Readiness Review (PRODUCTION READINESS).
16. Review and assess production and manufacturing aspects of Engineering Change Proposals and Change Orders. (ECP EVALUATION).
17. Accomplish surveillance of contractor production operations and monitor production progress (SURVEILLANCE/ MONITORING).
18. Perform analyses of contractor manufacturing management systems and manufacturing operations to assess efficiency and economy (MFG. MGMT. SYS/OPS EVAL.).
19. Provide technical assistance to engineering inspections, configuration management audits, performance audits, quality surveys, and other special reviews (SPECIAL SURVEYS/AUDITS).
20. Prepare production assessment reports (PROD. ASSESSMENT REPORTS).
21. Coordinate program activities relating to strikes and work stoppages at contractor operated facilities (STRIKE INFORMATION).

22. Provide production input to intercommand activities such as spares provisioning, system turnover, and transition (INTERCOMMAND SUPPORT).
23. Conduct post-award orientation conferences (POST AWARD ORIENTATION).
24. Evaluate contractor cost expenditures on production areas such as overtime, overrun/cost-growth, progress payments and over and above work (COST EXPENDITURE EVAL.).
25. Evaluate contractor's make or buy programs and decisions (MAKE OR BUY EVAL.).
26. Develop and participate in special scheduling programs due to expedite requests, schedule delinquencies or amended shipping instructions (EXPEDITING/RESCHEDULING).

APPENDIX C

PROGRAM OFFICE QUESTION SET

The question set and choices of ordinal responses provided to each program office respondent are shown in Figure C.1. These questions differ from the AFPRO questions only in the use of the acronym "AFPRO" in the third and fourth questions.

Question 1. Within the past year, approximately how much time do you think your production organization has spent on this task?

(0)	(1)	(2)	(3)	(4)	(5)
No opinion	None	Very little	A fair amount	A lot	Nearly all

____ Not Applicable ____ Other Response

Question 2. How much importance do you think your production organization attaches to this task relative to the production management decisions made on the program?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	No Importance	Little Importance	Acceptable Amount	Significant Importance	Great Importance

____ Not Applicable ____ Other Response

Question 3. Within the past year, approximately how much time do you think that your counterpart AFPRO production organization has spent on this task?

(0)	(1)	(2)	(3)	(4)	(5)
No opinion	None	Very little	A fair amount	A lot	Nearly all

____ Not Applicable ____ Other Response

Question 4. How much importance do you think your counterpart AFPRO production organization attaches to this task relative to the production management decisions made on the program?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	No Importance	Little Importance	Acceptable Amount	Significant Importance	Great Importance

____ Not Applicable ____ Other Response

Figure C.1

Program Office Question Set

APPENDIX D

AFPRO QUESTION SET

Figure D.1 shows the question set presented to each AFPRO respondent. This set is identical to the question set shown in Figure C.1, except for the acronym "SPO" appearing in the third and fourth questions.

Question 1. Within the past year, approximately how much time do you think your production organization has spent on this task?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	None	Very little	A fair amount	A lot	Nearly all

____ Not Applicable ____ Other Response

Question 2. How much importance do you think your production organization attaches to this task relative to the production management decisions made on the program?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	No Importance	Little Importance	Acceptable Amount	Significant Importance	Great Importance

____ Not Applicable ____ Other Response

Question 3. Within the past year, approximately how much time do you think that your counterpart SPO production organization has spent on this task?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	None	Very little	A fair amount	A lot	Nearly all

____ Not Applicable ____ Other Response

Question 4. How much importance do you think your counterpart SPO production organization attaches to this task relative to the production management decisions made on the program?

(0)	(1)	(2)	(3)	(4)	(5)
No Opinion	No Importance	Little Importance	Acceptable Amount	Significant Importance	Great Importance

____ Not Applicable ____ Other Response

Figure D.1

AFPRO Question Set

APPENDIX E

RESPONSE RECORD SHEET

Figure E.1 shows the worksheet used to record responses selected by respondents. Task numbers were assigned immediately before the interview, using the sample plans illustrated in Figure H.2. The notation IQ1, IQ2, IQ3 and IQ4 refer to the applicable interview questions from Appendix C or Appendix D. Responses were recorded by the interviewer's placing of an "X" on the appropriate line under the "Response" column.

INTERVIEW WORKSHEET

INTERVIEW QUESTION			Response	Respondent's Comments
IQ1	(0)	no opinion		
	(1)	none		
	(2)	very little		
	(3)	a fair amount		
	(4)	a lot		
	(5)	nearly all		
	( )	not applicable		
	( )	other response		
IQ2	(0)	no opinion		
	(1)	no importance		
	(2)	little		
	(3)	acceptable		
	(4)	significant		
	(5)	great		
	( )	not applicable		
	( )	other response		
IQ3	(0)	no opinion		
	(1)	none		
	(2)	very little		
	(3)	a fair amount		
	(4)	a lot		
	(5)	nearly all		
	( )	not applicable		
	( )	other response		
IQ4	(0)	no opinion		
	(1)	no importance		
	(2)	little		
	(3)	acceptable		
	(4)	significant		
	(5)	great		
	( )	not applicable		
	( )	other response		

P. O.____ AFPRO____ CONTROL NUMBER_____ INTERVIEWER_____

DATE_____ TASK NUMBER_____

Figure E.1

Response Record Sheet

APPENDIX F

PROGRAM PHASE OPINION SHEET

Figure 1 shows the control data sheet used at the conclusion of each interview to verify the respondent's frame of reference. All responses from a production entity were cross-checked to assure a consistent frame of reference. There were no inconsistencies recorded within any production entity studied.

This chart represents the phases of a program throughout its Acquisition Life Cycle.

CONCEPTUAL	VALIDATION	FULL SCALE DEVELOPMENT	PRODUCTION

(1) Draw a vertical arrow on the chart that represents the present time for this program.

(2) Draw a diamond on the chart that represents the time one year ago.

_____CONTROL NUMBER ____ DATE

Figure F.1

Program Phase Opinion Sheet

APPENDIX G

SOURCES OF EXPERT OPINION FOR VALIDATION OF INTERVIEW METHODOLOGY

Expert opinion was sought in three areas for validation of the interview methodology prior to actual data collection.

The following individuals contributed to the content of the task list and the wording of the task descriptions used in the study:

Mr. Donald Benoit, Director of Advanced Production Management, School of Systems and Logistics, Air Force Institute of Technology.

Major D. Ronald Wright, USAF, Production Staff Officer, Directorate of Procurement Policy, Deputy Chief of Staff (Installations and Logistics), Headquarters, U. S. Air Force.

Captain Alfred Weissensee, USAF, Production Staff Officer, Directorate of Production/Manufacturing, Deputy Chief of Staff/Systems, Headquarters, Air Force Systems Command.

The wording of the interview questions and the descriptions of the ordinal response choices were discussed with Lieutenant Colonel Stephen E. Barndt, USAF. Lieutenant Colonel Barndt is an Assistant Professor of Management and the AFIT/SLG Survey Instrument Control Officer.

The following individuals participated in the pilot study to assess the interviewer's technique. Their constructive remarks at the conclusion of these trial interviews were particularly valuable.

Major Jack Bryan, USAF, Chief, Production Branch, Production Division, Deputy for F-15/JEPO, Aeronautical Systems Division.

Major Robert S. Black, USAF, Chief, Production Branch, Procurement and Production Division, F/RF-4 System Program Office, Deputy for Systems, Aeronautical Systems Division.

Major Thomas Michalowski, USAF, Research Associate, Air Force Business Research Management Center, Directorate of Procurement Policy, Deputy Chief of Staff (Installations and Logistics), Headquarters, U. S. Air Force.

APPENDIX H

METHOD FOR SELECTION OF TASK SETS FOR PARTICULAR INTERVIEWS

Sampling plans for various numbers of respondents were prepared by the computer program shown in Figure H.1. The logic of this program randomly assigns each task to two of the designated number of task sets. Task sets are made uniform in size by randomly selecting tasks a third time, if necessary. A sample of the program output is shown in Figure H.2.

The effect of the sampling plan was to reduce the size of the interviewing task approximately 40 percent. At the same time, two responses were obtained randomly, rather than asking two individuals identical sets of questions. The intent was to give a random effect to the influence of any one individual's responses.

```
10*#RUN *=(ULIB)GRADLIB/TSS,R
20 DIMENSION AMAT(31,21)
30 1 PRINT, "NR. TASK SETS DESIRED? MAXIMUM IS 15."
40 READ, NS
50 PRINT, "NR. TASKS PER SET? USE 52 OVER ABOVE NUMBER,"
60 PRINT, "ROUNDED UP TO NEXT INTEGER."
70 READ, NT
80 LO=(NS*NT)-52
90 PRINT 77, NS
100 77 FORMAT(16H SAMPLE PLAN FOR,I5,13H RESPONDENTS.)
110 PRINT, "  "
120 DO 30 I=1,31
130 DO 30 J=1,21
140 AMAT(I,J)=0
150 30 CONTINUE
160 2 DO 10 I=1,26
170 DO 10 K=1,2
180 3 J=1+NS*RND(1)
190 IF(AMAT(I,J).NE.0) GO TO 3
200 IF(AMAT(I,21).GE.2.) GO TO 3
210 IF(AMAT(31,J).GE.NT) GO TO 3
220 AMAT(I,J)=I
230 AMAT(31,J)=AMAT(31,J)+1.
240 AMAT(I,21)=AMAT(I,21)+1.
250 AMAT(31,21)=AMAT(31,21)+1.
260 10 CONTINUE
270 M=LO
280 IF(M.EQ.0) GO TO 6
290 DO 15 K=1,NS
300 IF(AMAT(31,K).GE.NT) GO TO 15
310 4 I=1+26*RND(1)
320 IF(AMAT(I,K).NE.0) GO TO 4
330 AMAT(I,K)=I
340 AMAT(31,K)=AMAT(31,K)+1.
350 AMAT(I,21)=AMAT(I,21)+1.
360 AMAT(31,21)=AMAT(31,21)+1.
370 IF(AMAT(31,K).LT.NT) GO TO 4
380 15 CONTINUE
390 6 PRINT 98, (J,J=1,NS)
400 98 FORMAT(4X,15I4)
410 DO 20 K=1,31
420 PRINT 99, K, (AMAT(K,J),J=1,NS)
430 99 FORMAT(I5,15F4.0)
440 20 CONTINUE
450 STOP
460 END
```

Figure H.1

Sampling Plan Program Coding

```
NR. TASK SETS DESIRED? MAXIMUM IS 15.
=9
NR. TASKS PER SET? USE 52 OVER ABOVE NUMBER,
ROUNDED UP TO NEXT INTEGER.
=6
SAMPLE PLAN FOR     9 RESPONDENTS.
```

	1	2	3	4	5	6	7	8	9
1	0.	1.	0.	0.	0.	0.	0.	0.	1.
2	0.	0.	0.	0.	2.	0.	0.	0.	2.
3	0.	0.	0.	3.	3.	0.	0.	0.	0.
4	0.	0.	0.	4.	0.	0.	4.	0.	0.
5	0.	0.	0.	0.	5.	0.	5.	0.	5.
6	0.	6.	0.	0.	0.	0.	0.	6.	6.
7	7.	0.	0.	0.	0.	0.	0.	0.	7.
8	0.	0.	0.	0.	8.	8.	0.	0.	0.
9	0.	0.	0.	0.	0.	9.	0.	9.	0.
10	0.	0.	0.	0.	10.	0.	0.	10.	0.
11	11.	0.	0.	0.	0.	0.	0.	11.	0.
12	12.	0.	12.	0.	0.	0.	0.	0.	0.
13	13.	0.	0.	0.	0.	13.	0.	0.	0.
14	0.	0.	14.	14.	0.	0.	0.	0.	0.
15	0.	15.	15.	0.	0.	0.	0.	0.	0.
16	0.	0.	0.	16.	0.	0.	16.	0.	0.
17	0.	0.	0.	17.	17.	0.	0.	0.	0.
18	18.	0.	0.	18.	0.	0.	0.	0.	0.
19	0.	0.	19.	0.	0.	19.	0.	0.	0.
20	0.	0.	0.	0.	0.	20.	0.	20.	0.
21	0.	0.	21.	0.	0.	0.	21.	0.	0.
22	0.	0.	22.	0.	0.	0.	22.	0.	0.
23	23.	23.	0.	0.	0.	0.	0.	0.	0.
24	0.	24.	0.	0.	0.	0.	24.	0.	0.
25	0.	25.	0.	0.	0.	25.	0.	0.	0.
26	0.	0.	0.	0.	0.	0.	0.	26.	26.
27	0.	0.	0.	0.	0.	0.	0.	0.	0.
28	0.	0.	0.	0.	0.	0.	0.	0.	0.
29	0.	0.	0.	0.	0.	0.	0.	0.	0.
30	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	6.	6.	6.	6.	6.	6.	6.	6.	6.

Figure H.2

A Selected Sample Plan

APPENDIX I

SUMMARY SHEETS FOR RECONCILIATION OF INDIVIDUAL RESPONSES INTO ORGANIZATIONAL RESPONSES

Individual responses were reduced to organizational responses for each question concerning each of the 26 tasks studied. Figure I.1 presents the form of the summary sheets prepared for each organization. Entries in the "Reconciliation" column were determined by the research team, using the individual ordinal responses and supplementary remarks provided by the respondents.

TASK	QUESTION	FIRST RESPONSE	SECOND RESPONSE	THIRD RESPONSE	RECONCILIATION
1	1 2 3 4				
2	1 2 3 4				
3	1 2 3 4				

Figure I.1

Partial Summary Sheet for Reconciling Individual Responses into Organizational Responses

Preceding page blank

APPENDIX J

INTERVIEW QUESTION RESPONSE PAIRINGS FOR TEST OF SPECIFIC NULL HYPOTHESES

Figure J.1 presents the specific question responses paired for testing null hypotheses. Individual organization responses were paired for testing null hypotheses H1 through H6. Summaries of response rankings were used to test the supporting hypotheses S1 through S4. For example, null hypothesis H5 was tested by matching responses to program office Question 2 with AFPRO Question 4.

PROGRAM OFFICE QUESTION	AFPRO QUESTION				PROGRAM OFFICE SUMMATION
	1	2	3	4	
1	H1		H2		S1
2		H4		H5	S2
3	H3				
4		H6			
AFPRO SUMMATION	S3	S4			

Figure J.1

Interview Question Response Pairings for Specific Hypothesis Tests

Preceding page blank

APPENDIX K

PAIRED ORGANIZATIONAL RESPONSES FOR SPECIFIC HYPOTHESES

The eighteen tables in this appendix present the ordinal scale responses and their corresponding ranks for Hypotheses H1 through H6 for each of the three programs included in the study. Also included in each table is the signed difference between the program office and AFPRO rankings compared. Tasks ranked significantly different according to the criteria of Appendix L are identified by an asterisk to the left of the task description.

TABLE K.1

HYPOTHESIS 1, PROGRAM A. COMPARISON OF TASK RANKINGS BY TIME OWN ORGANIZATION SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.0	2.0	11.5	19.5	-8.0
PRODUCTION FEASIBILITY	3.0	4.0	11.5	3.5	8.0
*MILESTONES/MASTER SCHED.	3.5	1.0	6.5	25.0	-18.5
MUL/PRIORITIES	2.0	2.0	22.5	19.5	3.0
MEMORANDUM OF AGREEMENT	4.0	4.0	2.5	3.5	-1.0
CONTRACT REQUIREMENTS	2.5	3.0	18.0	10.5	7.5
GOVT. FURN. PROPERTY	3.5	2.0	6.5	19.5	-13.0
PREAWARD SURVEYS	1.0	2.0	25.5	19.5	6.0
SOURCE SELECTION	1.0	3.0	25.5	10.5	15.0
CONTRACTOR PROG. DOC.	4.0	4.0	2.5	3.5	-1.0
PROPOSAL EVALUATION	3.0	4.0	11.5	3.5	8.0
PRODUCIBILITY	3.0	3.0	11.5	10.5	1.0
PRODUCTION RISK ASSESS.	3.0	3.0	11.5	10.5	1.0
MFG. METHODS/TECHNOLOGY	3.0	2.5	11.5	15.5	-4.0
PRODUCTION READINESS	4.0	2.0	2.5	19.5	-17.0
ECP EVALUATION	3.5	3.0	6.5	10.5	-4.0
SURVEILLANCE/MONITORING	4.0	4.0	2.5	3.5	-1.0
*MFG. MGMT. SYS/OPS EVAL.	2.5	4.0	18.0	3.5	14.5
SPECIAL SURVEYS/AUDITS	2.5	2.5	13.0	15.5	2.5
PROD. ASSESSMENT REPORTS	2.5	3.0	18.0	10.5	7.5
STRIKE INFORMATION	2.5	1.5	18.0	23.0	-5.0
INTERCOMMAND SUPPORT	2.5	3.0	18.0	10.5	7.5
POST AWARD ORIENTATION	1.5	1.0	24.0	25.0	-1.0
COST EXPENDITURE EVAL.	3.5	3.0	6.5	10.5	-4.0
MAKE OR BUY EVAL.	2.5	2.0	18.0	19.5	-1.5
EXPEDITING/RESCHEDULING	2.0	1.0	22.5	25.0	-2.5

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 1 TAU = 0.31 Z = 2.24

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.2

HYPOTHESIS 1, PROGRAM B. COMPARISON OF TASK RANKINGS BY TIME OWN ORGANIZATION SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	Ø.	2.Ø	25.Ø	16.5	8.5
PRODUCTION FEASIBILITY	3.Ø	2.Ø	12.5	16.5	-4.Ø
MILESTONES/MASTER SCHED.	4.Ø	2.3	2.5	13.Ø	-1Ø.5
MUL/PRIORITIES	3.Ø	2.5	12.5	12.Ø	Ø.5
MEMORANDUM OF AGREEMENT	3.5	4.Ø	6.5	2.Ø	4.5
CONTRACT REQUIREMENTS	4.Ø	2.Ø	2.5	16.5	-14.Ø
GOVT. FURN. PROPERTY	4.3	2.Ø	1.Ø	16.5	-15.5
PREAWARD SURVEYS	2.Ø	1.Ø	18.Ø	23.Ø	-5.Ø
SOURCE SELECTION	Ø.5	1.Ø	23.Ø	23.Ø	Ø.Ø
CONTRACTOR PROG. DOC.	3.Ø	2.Ø	12.5	16.5	-4.Ø
PROPOSAL EVALUATION	3.5	3.3	6.5	6.5	-Ø.Ø
PRODUCIBILITY	2.5	1.Ø	16.Ø	23.Ø	-7.Ø
PRODUCTION RISK ASSESS.	3.5	3.Ø	6.5	9.Ø	-2.5
MFG. METHODS/TECHNOLOGY	3.5	3.7	6.5	4.Ø	2.5
PRODUCTION READINESS	1.Ø	1.Ø	21.5	23.Ø	-1.5
ECP EVALUATION	3.5	3.3	6.5	6.5	-Ø.Ø
SURVEILLANCE/MONITORING	3.5	4.7	6.5	1.Ø	5.5
*MFG. MGMT. SYS/OPS EVAL.	1.Ø	3.7	21.5	4.Ø	17.5
SPECIAL SURVEYS/AUDITS	2.Ø	3.Ø	18.Ø	9.Ø	9.Ø
*PROD. ASSESSMENT REPORTS	Ø.	3.7	25.Ø	4.Ø	21.Ø
STRIKE INFORMATION	2.Ø	2.Ø	18.Ø	16.5	1.5
*INTERCOMMAND SUPPORT	3.Ø	1.Ø	12.5	23.Ø	-1Ø.5
POST AWARD ORIENTATION	Ø.	1.Ø	25.Ø	23.Ø	2.Ø
COST EXPENDITURE EVAL.	3.Ø	3.Ø	12.5	9.Ø	3.5
MAKE OR BUY EVAL.	1.5	1.Ø	2Ø.Ø	23.Ø	-3.Ø
EXPEDITING/RESCHEDULING	3.Ø	2.7	12.5	11.Ø	1.5

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 1 TAU = Ø.3Ø Z = 2.12

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.3

HYPOTHESIS 1, PROGRAM C. COMPARISON OF TASK RANKINGS BY TIME OWN ORGANIZATION SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	2.0	1.5	19.0	22.0	-3.0
PRODUCTION FEASIBILITY	4.5	2.5	1.0	18.0	-17.0
MILESTONES/MASTER SCHED.	2.0	2.5	19.0	18.0	1.0
MUL/PRIORITIES	2.5	2.0	14.0	21.0	-7.0
*MEMORANDUM OF AGREEMENT	2.5	4.0	14.0	3.0	11.0
CONTRACT REQUIREMENTS	2.5	2.5	14.0	18.0	-4.0
GOVT. FURN. PROPERTY	3.0	3.0	9.0	12.5	-3.5
PREAWARD SURVEYS	1.0	0.5	25.5	26.0	-0.5
SOURCE SELECTION	1.5	1.0	23.0	24.0	-1.0
CONTRACTOR PROG. DOC.	4.0	2.5	2.5	18.0	-15.5
PROPOSAL EVALUATION	3.0	3.0	9.0	12.5	-3.5
PRODUCIBILITY	3.0	3.3	9.0	9.0	-0.0
PRODUCTION RISK ASSESS.	3.5	3.0	5.0	12.5	-7.5
MFG. METHODS/TECHNOLOGY	1.5	2.5	23.0	18.0	5.0
*PRODUCTION READINESS	3.0	1.0	9.0	24.0	-15.0
ECP EVALUATION	3.5	4.0	5.0	3.0	2.0
SURVEILLANCE/MONITORING	3.0	4.0	9.0	3.0	6.0
*MFG. MGMT. SYS/OPS EVAL.	2.0	4.0	19.0	3.0	16.0
SPECIAL SURVEYS/AUDITS	2.5	3.7	14.0	6.0	8.0
PROD. ASSESSMENT REPORTS	2.0	3.5	19.0	7.5	11.5
STRIKE INFORMATION	2.5	3.0	14.0	12.5	1.5
INTERCOMMAND SUPPORT	4.0	3.5	2.5	7.5	-5.0
POST AWARD ORIENTATION	1.0	1.0	25.5	24.0	1.5
*COST EXPENDITURE EVAL.	2.0	4.0	19.0	3.0	16.0
MAKE OR BUY EVAL.	1.5	3.0	23.0	12.5	10.5
EXPEDITING/RESCHEDULING	3.5	3.0	5.0	12.5	-7.5

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 1 TAU = 0.22 Z = 1.58

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.4

HYPOTHESIS 2, PROGRAM A. COMPARISON OF TASK RANKINGS BY OPINION OF TIME PROGRAM OFFICE SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.0	3.0	11.5	6.0	5.5
PRODUCTION FEASIBILITY	3.0	3.0	11.5	6.0	5.5
MILESTONES/MASTER SCHED.	3.5	1.5	6.5	18.0	-11.5
MOL/PRIORITIES	2.0	2.0	22.5	12.5	10.0
MEMORANDUM OF AGREEMENT	4.0	3.0	2.5	6.0	-3.5
CONTRACT REQUIREMENTS	2.5	3.0	18.0	6.0	12.0
GOVT. FURN. PROPERTY	3.5	3.0	6.5	6.0	0.5
PREAWARD SURVEYS	1.0	1.5	25.5	18.0	7.5
SOURCE SELECTION	1.0	2.0	25.5	12.5	13.0
*CONTRACTOR PROG. DOC.	4.0	1.0	2.5	23.0	-20.5
PROPOSAL EVALUATION	3.0	3.0	11.5	6.0	5.5
PRODUCIBILITY	3.0	3.5	11.5	1.5	10.0
PRODUCTION RISK ASSESS.	3.0	3.0	11.5	6.0	5.5
MFG. METHODS/TECHNOLOGY	3.0	2.0	11.5	12.5	-1.0
PRODUCTION READINESS	4.0	2.0	2.5	12.5	-10.0
*ECP EVALUATION	3.5	0.	6.5	26.0	-19.5
SURVEILLANCE/MONITORING	4.0	3.5	2.5	1.5	1.0
MFG. MGMT. SYS/OPS EVAL.	2.5	1.5	18.0	18.0	-0.0
SPECIAL SURVEYS/AUDITS	2.5	2.0	18.0	12.5	5.5
PROD. ASSESSMENT REPORTS	2.5	1.0	18.0	23.0	-5.0
STRIKE INFORMATION	2.5	1.0	18.0	23.0	-5.0
INTERCOMMAND SUPPORT	2.5	1.5	18.0	18.0	-0.0
POST AWARD ORIENTATION	1.5	1.0	24.0	23.0	1.0
COST EXPENDITURE EVAL.	3.5	2.0	6.5	12.5	-6.0
MAKE OR BUY EVAL.	2.5	1.5	18.0	18.0	-0.0
EXPEDITING/RESCHEDULING	2.0	1.0	22.5	23.0	-0.5

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 3 TAU = 0.27 Z = 1.95

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.5

HYPOTHESIS 2, PROGRAM B. COMPARISON OF TASK RANKINGS BY OPINION OF TIME PROGRAM OFFICE SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	Ø.	2.5	25.Ø	13.5	11.5
PRODUCTION FEASIBILITY	3.Ø	2.Ø	12.5	16.5	-4.Ø
MILESTONES/MASTER SCHED.	4.Ø	2.7	2.5	11.5	-9.Ø
MUL/PRIORITIES	3.Ø	2.Ø	12.5	16.5	-4.Ø
MEMORANDUM OF AGREEMENT	3.5	4.Ø	6.5	2.Ø	4.5
CONTRACT REQUIREMENTS	4.Ø	3.Ø	2.5	8.Ø	-5.5
GOVT. FURN. PROPERTY	4.3	4.Ø	1.Ø	2.Ø	-1.Ø
PREAWARD SURVEYS	2.Ø	1.Ø	18.Ø	22.Ø	-4.Ø
SOURCE SELECTION	Ø.5	1.Ø	23.Ø	22.Ø	1.Ø
CONTRACTOR PROG. DOC.	3.Ø	2.Ø	12.5	16.5	-4.Ø
PROPOSAL EVALUATION	3.5	3.Ø	6.5	8.Ø	-1.5
PRODUCIBILITY	2.5	1.Ø	16.Ø	22.Ø	-6.Ø
PRODUCTION RISK ASSESS.	3.5	3.5	6.5	4.Ø	2.5
MFG. METHODS/TECHNOLOGY	3.5	2.7	6.5	11.5	-5.Ø
PRODUCTION READINESS	1.Ø	1.Ø	21.5	22.Ø	-Ø.5
ECP EVALUATION	3.5	3.Ø	6.5	8.Ø	-1.5
SURVEILLANCE/MONITORING	3.5	4.Ø	6.5	2.Ø	4.5
MFG. MGMT. SYS/OPS EVAL.	1.Ø	1.Ø	21.5	22.Ø	-Ø.5
SPECIAL SURVEYS/AUDITS	2.Ø	3.Ø	18.Ø	8.Ø	10.Ø
*PROD. ASSESSMENT REPORTS	Ø.	3.3	25.Ø	5.Ø	20.Ø
STRIKE INFORMATION	2.Ø	2.Ø	18.Ø	16.5	1.5
INTERCOMMAND SUPPORT	3.Ø	1.Ø	12.5	22.Ø	-9.5
POST AWARD ORIENTATION	Ø.	Ø.	25.Ø	26.Ø	-1.Ø
COST EXPENDITURE EVAL.	3.Ø	3.Ø	12.5	8.Ø	4.5
MAKE OR BUY EVAL.	1.5	1.Ø	20.Ø	22.Ø	-2.Ø
EXPEDITING/RESCHEDULING	3.Ø	2.5	12.5	13.5	-1.Ø

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 3 TAU = Ø.53 Z = 3.8Ø

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.6

HYPOTHESIS 2, PROGRAM C. COMPARISON OF TASK RANKINGS BY OPINION OF TIME PROGRAM OFFICE SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	2.0	3.0	19.0	13.5	5.5
PRODUCTION FEASIBILITY	4.5	3.0	1.0	13.5	-12.5
MILESTONES/MASTER SCHED.	2.0	3.5	19.0	6.5	12.5
MUL/PRIORITIES	2.5	3.0	14.0	13.5	0.5
MEMORANDUM OF AGREEMENT	2.5	3.0	14.0	13.5	0.5
CONTRACT REQUIREMENTS	2.5	3.0	14.0	13.5	0.5
GOVT. FURN. PROPERTY	3.0	3.5	9.0	6.5	2.5
PREAWARD SURVEYS	1.0	0.5	25.5	26.0	-0.5
SOURCE SELECTION	1.5	1.0	23.0	24.0	-1.0
CONTRACTOR PROG. DOC.	4.0	3.0	2.5	13.5	-11.0
*PROPOSAL EVALUATION	3.0	1.0	9.0	24.0	-15.0
PRODUCIBILITY	3.0	3.5	9.0	6.5	2.5
PRODUCTION RISK ASSESS.	3.5	3.0	5.0	13.5	-8.5
*MFG. METHODS/TECHNOLOGY	1.5	4.0	23.0	2.0	21.0
*PRODUCTION READINESS	3.0	1.0	9.0	24.0	-15.0
ECP EVALUATION	3.5	3.5	5.0	6.5	-1.5
SURVEILLANCE/MONITORING	3.0	2.5	9.0	19.0	-10.0
MFG. MGMT. SYS/OPS EVAL.	2.0	2.0	19.0	21.0	-2.0
SPECIAL SURVEYS/AUDITS	2.5	3.7	14.0	4.0	10.0
PROD. ASSESSMENT REPORTS	2.0	3.0	19.0	13.5	5.5
STRIKE INFORMATION	2.5	2.0	14.0	21.0	-7.0
INTERCOMMAND SUPPORT	4.0	4.0	2.5	2.0	0.5
POST AWARD ORIENTATION	1.0	3.0	25.5	13.5	12.0
*COST EXPENDITURE EVAL.	2.0	4.0	19.0	2.0	17.0
MAKE OR BUY EVAL.	1.5	2.0	23.0	21.0	2.0
EXPEDITING/RESCHEDULING	3.5	3.0	5.0	13.5	-8.5

PROGRAM OFFICE QUESTION 1
AFPRO QUESTION 3 TAU = 0.15 Z = 1.09

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.7

HYPOTHESIS 3, PROGRAM A. COMPARISON OF TASK RANKINGS BY OPINION OF TIME AFPRO SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.0	2.0	18.5	19.5	-1.0
*PRODUCTION FEASIBILITY	3.0	4.0	18.5	3.5	15.0
*MILESTONES/MASTER SCHED.	4.0	1.0	4.5	25.0	-20.5
MUL/PRIORITIES	2.0	2.0	25.5	19.5	6.0
MEMORANDUM OF AGREEMENT	4.0	4.0	4.5	3.5	1.0
CONTRACT REQUIREMENTS	3.0	3.0	18.5	10.5	8.0
GOVT. FURN. PROPERTY	3.5	2.0	12.0	19.5	-7.5
PREAWARD SURVEYS	3.5	2.0	12.0	19.5	-7.5
SOURCE SELECTION	2.5	3.0	23.0	10.5	12.5
CONTRACTOR PROG. DOC.	4.0	4.0	4.5	3.5	1.0
PROPOSAL EVALUATION	3.5	4.0	12.0	3.5	8.5
PRODUCIBILITY	3.5	3.0	12.0	10.5	1.5
PRODUCTION RISK ASSESS.	3.5	3.0	12.0	10.5	1.5
MFG. METHODS/TECHNOLOGY	2.5	2.5	23.0	15.5	7.5
PRODUCTION READINESS	4.0	2.0	4.5	19.5	-15.0
ECP EVALUATION	3.5	3.0	12.0	10.5	1.5
SURVEILLANCE/MONITORING	4.0	4.0	4.5	3.5	1.0
MFG. MGMT. SYS/OPS EVAL.	4.0	4.0	4.5	3.5	1.0
SPECIAL SURVEYS/AUDITS	3.0	2.5	18.5	15.5	3.0
PROD. ASSESSMENT REPORTS	3.5	3.0	12.0	10.5	1.5
STRIKE INFORMATION	3.0	1.5	18.5	23.0	-4.5
INTERCOMMAND SUPPORT	2.5	3.0	23.0	10.5	12.5
POST AWARD ORIENTATION	2.0	1.0	25.5	25.0	0.5
COST EXPENDITURE EVAL.	4.0	3.0	4.5	10.5	-6.0
MAKE OR BUY EVAL.	3.0	2.0	18.5	19.5	-1.0
*EXPEDITING/RESCHEDULING	4.0	1.0	4.5	25.0	-20.5

PROGRAM OFFICE QUESTION 3
AFPRO QUESTION 1 TAU = 0.23 Z = 1.68

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.8

HYPOTHESIS 3, PROGRAM B. COMPARISON OF TASK RANKINGS BY OPINION OF TIME AFPRO SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	Ø.	2.Ø	25.5	16.5	9.Ø
PRODUCTION FEASIBILITY	3.Ø	2.Ø	9.5	16.5	-7.Ø
MILESTONES/MASTER SCHED.	4.Ø	2.3	2.Ø	13.Ø	-11.Ø
MOL/PRIORITIES	3.Ø	2.5	9.5	12.Ø	-2.5
MEMORANDUM OF AGREEMENT	3.5	4.Ø	5.Ø	2.Ø	3.Ø
CONTRACT REQUIREMENTS	2.Ø	2.Ø	16.Ø	16.5	-Ø.5
GOVT. FURN. PROPERTY	2.7	2.Ø	13.Ø	16.5	-3.5
*PREAWARD SURVEYS	3.Ø	1.Ø	9.5	23.Ø	-13.5
SOURCE SELECTION	1.5	1.Ø	18.5	23.Ø	-4.5
CONTRACTOR PROG. DOC.	3.5	2.Ø	5.Ø	16.5	-11.5
PROPOSAL EVALUATION	3.Ø	3.3	9.5	6.5	3.Ø
PRODUCIBILITY	2.5	1.Ø	14.5	23.Ø	-8.5
PRODUCTION RISK ASSESS.	4.Ø	3.Ø	2.Ø	9.Ø	-7.Ø
MFG. METHODS/TECHNOLOGY	4.Ø	3.7	2.Ø	4.Ø	-2.Ø
PRODUCTION READINESS	1.Ø	1.Ø	22.5	23.Ø	-Ø.5
ECP EVALUATION	3.5	3.3	5.Ø	6.5	-1.5
SURVEILLANCE/MONITORING	3.Ø	4.7	9.5	1.Ø	8.5
*MFG. MGMT. SYS/OPS EVAL.	1.5	3.7	18.5	4.Ø	14.5
SPECIAL SURVEYS/AUDITS	3.Ø	3.Ø	9.5	9.Ø	Ø.5
*PROD. ASSESSMENT REPORTS	1.5	3.7	18.5	4.Ø	14.5
STRIKE INFORMATION	1.Ø	2.Ø	22.5	16.5	6.Ø
INTERCOMMAND SUPPORT	1.Ø	1.Ø	22.5	23.Ø	-Ø.5
POST AWARD ORIENTATION	Ø.	1.Ø	25.5	23.Ø	2.5
COST EXPENDITURE EVAL.	1.5	3.Ø	18.5	9.Ø	9.5
MAKE OR BUY EVAL.	1.Ø	1.Ø	22.5	23.Ø	-Ø.5
EXPEDITING/RESCHEDULING	2.5	2.7	14.5	11.Ø	3.5

PROGRAM OFFICE QUESTION 3
AFPRO QUESTION 1 TAU = Ø.38 Z = 2.73

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.9

HYPOTHESIS 3, PROGRAM C. COMPARISON OF TASK RANKINGS BY OPINION OF TIME AFPRO SPENDS

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	2.0	1.5	21.5	22.0	-0.5
PRODUCTION FEASIBILITY	4.5	2.5	1.0	18.0	-17.0
MILESTONES/MASTER SCHED.	2.0	2.5	21.5	18.0	3.5
MUL/PRIORITIES	2.5	2.0	15.5	21.0	-5.5
*MEMORANDUM OF AGREEMENT	2.5	4.0	15.5	3.0	12.5
CONTRACT REQUIREMENTS	2.5	2.5	15.5	18.0	-2.5
GOVT. FURN. PROPERTY	3.5	3.0	3.5	12.5	-9.0
PREAWARD SURVEYS	1.0	0.5	26.0	26.0	0.
SOURCE SELECTION	2.0	1.0	21.5	24.0	-2.5
CONTRACTOR PROG. DOC.	3.0	2.5	8.0	18.0	-10.0
PROPOSAL EVALUATION	2.0	3.0	21.5	12.5	9.0
PRODUCIBILITY	3.0	3.3	8.0	9.0	-1.0
PRODUCTION RISK ASSESS.	2.5	3.0	15.5	12.5	3.0
MFG. METHODS/TECHNOLOGY	3.0	2.5	8.0	18.0	-10.0
PRODUCTION READINESS	2.0	1.0	21.5	24.0	-2.5
*ECP EVALUATION	2.0	4.0	21.5	3.0	18.5
SURVEILLANCE/MONITORING	3.0	4.0	8.0	3.0	5.0
MFG. MGMT. SYS/OPS EVAL.	3.5	4.0	3.5	3.0	0.5
SPECIAL SURVEYS/AUDITS	2.5	3.7	15.5	6.0	9.5
PROD. ASSESSMENT REPORTS	2.7	3.5	12.0	7.5	4.5
STRIKE INFORMATION	3.0	3.0	8.0	12.5	-4.5
INTERCOMMAND SUPPORT	3.0	3.5	8.0	7.5	0.5
POST AWARD ORIENTATION	1.5	1.0	25.0	24.0	1.0
COST EXPENDITURE EVAL.	3.0	4.0	8.0	3.0	5.0
MAKE OR BUY EVAL.	2.5	3.0	15.5	12.5	3.0
EXPEDITING/RESCHEDULING	4.0	3.0	2.0	12.5	-10.5

PROGRAM OFFICE QUESTION 3
AFPRO QUESTION 1 TAU = 0.37 Z = 2.61

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.10

HYPOTHESIS 4, PROGRAM A. COMPARISON OF TASK RANKINGS BY IMPORTANCE OWN ORGANIZATION ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	4.0	2.0	12.5	22.5	-10.0
PRODUCTION FEASIBILITY	4.0	5.0	12.5	2.5	10.0
MILESTONES/MASTER SCHED.	4.5	4.5	3.0	7.0	-4.0
MUL/PRIORITIES	2.5	2.0	26.0	22.5	3.5
MEMORANDUM OF AGREEMENT	4.5	4.0	3.0	12.5	-9.5
CONTRACT REQUIREMENTS	3.5	3.5	22.0	17.0	5.0
GOVT. FURN. PROPERTY	4.0	3.0	12.5	19.5	-7.0
PREAWARD SURVEYS	3.5	4.0	22.0	12.5	9.5
SOURCE SELECTION	4.0	4.0	12.5	12.5	-0.0
CONTRACTOR PROG. DOC.	4.0	3.0	12.5	19.5	-7.0
PROPOSAL EVALUATION	4.0	4.5	12.5	7.0	5.5
PRODUCIBILITY	4.0	5.0	12.5	2.5	10.0
PRODUCTION RISK ASSESS.	4.0	4.5	12.5	7.0	5.5
MFG. METHODS/TECHNOLOGY	4.0	3.5	12.5	17.0	-4.5
PRODUCTION READINESS	4.0	5.0	12.5	2.5	10.0
ECP EVALUATION	4.0	2.0	12.5	22.5	-10.0
SURVEILLANCE/MONITORING	4.5	4.5	3.0	7.0	-4.0
MFG. MGMT. SYS/OPS EVAL.	4.0	4.5	12.5	7.0	5.5
SPECIAL SURVEYS/AUDITS	3.5	4.0	22.0	12.5	9.5
PROD. ASSESSMENT REPORTS	3.5	1.5	22.0	25.0	-3.0
STRIKE INFORMATION	4.0	4.0	12.5	12.5	-0.0
INTERCOMMAND SUPPORT	3.5	3.5	22.0	17.0	5.0
POST AWARD ORIENTATION	3.0	1.0	25.0	26.0	-1.0
COST EXPENDITURE EVAL.	4.0	4.0	12.5	12.5	-0.0
MAKE OR BUY EVAL.	4.5	5.0	3.0	2.5	0.5
*EXPEDITING/RESCHEDULING	4.5	2.0	3.0	22.5	-19.5

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 2 TAU = 0.37 Z = 2.64

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.11

HYPOTHESIS 4, PROGRAM B. COMPARISON OF TASK RANKINGS BY IMPORTANCE OWN ORGANIZATION ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	0.	4.0	25.0	12.5	12.5
PRODUCTION FEASIBILITY	4.0	4.7	9.0	4.0	5.0
MILESTONES/MASTER SCHED.	4.0	4.0	9.0	12.5	-3.5
*MUL/PRIORITIES	5.0	3.0	2.5	21.0	-18.5
MEMORANDUM OF AGREEMENT	5.0	4.7	2.5	4.0	-1.5
CONTRACT REQUIREMENTS	4.0	3.0	9.0	21.0	-12.0
*GOVT. FURN. PROPERTY	5.0	3.0	2.5	21.0	-18.5
PREAWARD SURVEYS	3.0	4.3	17.5	7.5	10.0
SOURCE SELECTION	0.5	2.0	23.0	23.5	-0.5
CONTRACTOR PROG. DOC.	4.0	4.0	9.0	12.5	-3.5
PROPOSAL EVALUATION	5.0	4.0	2.5	12.5	-10.0
PRODUCIBILITY	2.0	4.0	19.5	12.5	7.0
PRODUCTION RISK ASSESS.	4.5	4.7	5.0	4.0	1.0
*MFG. METHODS/TECHNOLOGY	3.5	4.7	14.5	4.0	10.5
PRODUCTION READINESS	2.0	4.0	19.5	12.5	7.0
ECP EVALUATION	4.0	3.7	9.0	18.0	-9.0
SURVEILLANCE/MONITORING	4.0	5.0	9.0	1.0	8.0
*MFG. MGMT. SYS/OPS EVAL.	1.5	4.7	21.5	4.0	17.5
SPECIAL SURVEYS/AUDITS	3.5	4.0	14.5	12.5	2.0
PROD. ASSESSMENT REPORTS	0.	4.3	25.0	7.5	17.5
STRIKE INFORMATION	1.5	3.7	21.5	18.0	3.5
*INTERCOMMAND SUPPORT	4.0	2.0	9.0	23.5	-14.5
POST AWARD ORIENTATION	0.	1.0	25.0	25.5	-0.5
COST EXPENDITURE EVAL.	3.0	4.0	17.5	12.5	5.0
*MAKE OR BUY EVAL.	3.5	1.0	14.5	25.5	-11.0
EXPEDITING/RESCHEDULING	3.5	3.7	14.5	18.0	-3.5

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 2 TAU = 0.06 Z = 0.46

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.12

HYPOTHESIS 4, PROGRAM C. COMPARISON OF TASK RANKINGS BY IMPORTANCE OWN ORGANIZATION ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.5	3.0	25.5	23.5	2.0
PRODUCTION FEASIBILITY	5.0	4.5	4.5	5.5	-1.0
MILESTONES/MASTER SCHED.	3.5	3.5	25.5	20.0	5.5
*MUL/PRIORITIES	4.0	4.5	22.0	5.5	16.5
MEMORANDUM OF AGREEMENT	4.5	4.0	14.0	13.5	0.5
*CONTRACT REQUIREMENTS	4.0	4.5	22.0	5.5	16.5
GOVT. FURN. PROPERTY	5.0	3.5	4.5	20.0	-15.5
PREAWARD SURVEYS	4.5	2.5	14.0	26.0	-12.0
SOURCE SELECTION	4.5	4.0	14.0	13.5	0.5
*CONTRACTOR PROG. DOC.	5.0	3.0	4.5	23.5	-19.0
PROPOSAL EVALUATION	5.0	4.0	4.5	13.5	-9.0
PRODUCIBILITY	4.5	3.7	14.0	18.0	-4.0
PRODUCTION RISK ASSESS.	5.0	4.0	4.5	13.5	-9.0
MFG. METHODS/TECHNOLOGY	4.0	4.0	22.0	13.5	8.5
PRODUCTION READINESS	4.5	4.0	14.0	13.5	0.5
ECP EVALUATION	5.0	4.5	4.5	5.5	-1.0
*SURVEILLANCE/MONITORING	4.5	5.0	14.0	1.5	12.5
MFG. MGMT. SYS/OPS EVAL.	4.5	4.5	14.0	5.5	8.5
SPECIAL SURVEYS/AUDITS	4.0	4.3	22.0	9.0	13.0
PROD. ASSESSMENT REPORTS	4.5	3.5	14.0	20.0	-6.0
STRIKE INFORMATION	4.5	4.0	14.0	13.5	0.5
INTERCOMMAND SUPPORT	5.0	4.0	4.5	13.5	-9.0
*POST AWARD ORIENTATION	4.0	4.5	22.0	5.5	16.5
*COST EXPENDITURE EVAL.	4.5	5.0	14.0	1.5	12.5
MAKE OR BUY EVAL.	4.5	3.0	14.0	23.5	-9.5
*EXPEDITING/RESCHEDULING	5.0	3.0	4.5	23.5	-19.0

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 2 TAU =-0.08 Z =-0.60

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.13

HYPOTHESIS 5, PROGRAM A. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE PROGRAM OFFICE ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	4.0	4.0	12.5	9.5	3.0
PRODUCTION FEASIBILITY	4.0	4.0	12.5	9.5	3.0
MILESTONES/MASTER SCHED.	4.5	4.5	3.0	4.0	-1.0
MUL/PRIORITIES	2.5	2.0	26.0	18.5	7.5
MEMORANDUM OF AGREEMENT	4.5	3.0	3.0	16.5	-13.5
CONTRACT REQUIREMENTS	3.5	4.0	22.0	9.5	12.5
GOVT. FURN. PROPERTY	4.0	3.0	12.5	16.5	-4.0
*PREAWARD SURVEYS	3.5	4.5	22.0	4.0	18.0
SOURCE SELECTION	4.0	4.0	12.5	9.5	3.0
*CONTRACTOR PROG. DOC.	4.0	0.	12.5	25.5	-13.0
PROPOSAL EVALUATION	4.0	3.5	12.5	14.0	-1.5
PRODUCIBILITY	4.0	4.5	12.5	4.0	8.5
PRODUCTION RISK ASSESS.	4.0	4.5	12.5	4.0	8.5
MFG. METHODS/TECHNOLOGY	4.0	3.5	12.5	14.0	-1.5
*PRODUCTION READINESS	4.0	5.0	12.5	1.0	11.5
*ECP EVALUATION	4.0	0.	12.5	25.5	-13.0
SURVEILLANCE/MONITORING	4.5	4.5	3.0	4.0	-1.0
MFG. MGMT. SYS/OPS EVAL.	4.0	1.5	12.5	21.0	-8.5
SPECIAL SURVEYS/AUDITS	3.5	3.5	22.0	14.0	8.0
PROD. ASSESSMENT REPORTS	3.5	1.0	22.0	23.5	-1.5
STRIKE INFORMATION	4.0	1.5	12.5	21.0	-8.5
INTERCOMMAND SUPPORT	3.5	1.5	22.0	21.0	1.0
POST AWARD ORIENTATION	3.0	1.0	25.0	23.5	1.5
COST EXPENDITURE EVAL.	4.0	4.0	12.5	9.5	3.0
MAKE OR BUY EVAL.	4.5	4.0	3.0	9.5	-6.5
EXPEDITING/RESCHEDULING	4.5	2.0	3.0	18.5	-15.5

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 4

TAU = 0.22 Z = 1.61

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.14

HYPOTHESIS 5, PROGRAM B. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE PROGRAM OFFICE ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	0.	4.0	25.0	12.5	12.5
PRODUCTION FEASIBILITY	4.0	3.0	9.0	19.5	-10.5
MILESTONES/MASTER SCHED.	4.0	4.0	9.0	12.5	-3.5
MUL/PRIORITIES	5.0	4.0	2.5	12.5	-10.0
MEMORANDUM OF AGREEMENT	5.0	4.3	2.5	6.5	-4.0
CONTRACT REQUIREMENTS	4.0	4.0	9.0	12.5	-3.5
GOVT. FURN. PROPERTY	5.0	4.3	2.5	6.5	-4.0
*PREAWARD SURVEYS	3.0	4.5	17.5	3.5	14.0
SOURCE SELECTION	0.5	2.0	23.0	21.5	1.5
CONTRACTOR PROG. DOC.	4.0	4.0	9.0	12.5	-3.5
PROPOSAL EVALUATION	5.0	4.0	2.5	12.5	-10.0
PRODUCIBILITY	2.0	0.	19.5	25.5	-6.0
PRODUCTION RISK ASSESS.	4.5	4.7	5.0	1.5	3.5
MFG. METHODS/TECHNOLOGY	3.5	3.0	14.5	19.5	-5.0
PRODUCTION READINESS	2.0	4.0	19.5	12.5	7.0
ECP EVALUATION	4.0	3.7	9.0	17.5	-8.5
SURVEILLANCE/MONITORING	4.0	4.7	9.0	1.5	7.5
MFG. MGMT. SYS/OPS EVAL.	1.5	2.0	21.5	21.5	0.
SPECIAL SURVEYS/AUDITS	3.5	4.3	14.5	6.5	8.0
PROD. ASSESSMENT REPORTS	0.	4.3	25.0	6.5	18.5
STRIKE INFORMATION	1.5	3.7	21.5	17.5	4.0
* INTERCOMMAND SUPPORT	4.0	1.0	9.0	23.5	-14.5
POST AWARD ORIENTATION	0.	0.	25.0	25.5	-0.5
* COST EXPENDITURE EVAL.	3.0	4.5	17.5	3.5	14.0
MAKE OR BUY EVAL.	3.5	1.0	14.5	23.5	-9.0
EXPEDITING/RESCHEDULING	3.5	4.0	14.5	12.5	2.0

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 4 TAU = 0.26 Z = 1.83

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.15

HYPOTHESIS 5, PROGRAM C. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE PROGRAM OFFICE ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.5	4.0	25.5	12.0	13.5
PRODUCTION FEASIBILITY	5.0	4.0	4.5	12.0	-7.5
*MILESTONES/MASTER SCHED.	3.5	5.0	25.5	2.5	23.0
MUL/PRIORITIES	4.0	3.0	22.0	21.5	0.5
MEMORANDUM OF AGREEMENT	4.5	4.0	14.0	12.0	2.0
CONTRACT REQUIREMENTS	4.0	4.5	22.0	5.5	16.5
GOVT. FURN. PROPERTY	5.0	3.5	4.5	17.5	-13.0
*PREAWARD SURVEYS	4.5	0.5	14.0	26.0	-12.0
*SOURCE SELECTION	4.5	5.0	14.0	2.5	11.5
CONTRACTOR PROG. DOC.	5.0	4.0	4.5	12.0	-7.5
PROPOSAL EVALUATION	5.0	4.0	4.5	12.0	-7.5
PRODUCIBILITY	4.5	3.5	14.0	17.5	-3.5
PRODUCTION RISK ASSESS.	5.0	4.0	4.5	12.0	-7.5
MFG. METHODS/TECHNOLOGY	4.0	3.0	22.0	21.5	0.5
PRODUCTION READINESS	4.5	4.0	14.0	12.0	2.0
ECP EVALUATION	5.0	4.5	4.5	5.5	-1.0
SURVEILLANCE/MONITORING	4.5	4.0	14.0	12.0	2.0
*MFG. MGMT. SYS/OPS EVAL.	4.5	1.0	14.0	25.0	-11.0
SPECIAL SURVEYS/AUDITS	4.0	4.3	22.0	7.0	15.0
PROD. ASSESSMENT REPORTS	4.5	3.0	14.0	21.5	-7.5
STRIKE INFORMATION	4.5	3.0	14.0	21.5	-7.5
INTERCOMMAND SUPPORT	5.0	5.0	4.5	2.5	2.0
POST AWARD ORIENTATION	4.0	4.0	22.0	12.0	10.0
*COST EXPENDITURE EVAL.	4.5	5.0	14.0	2.5	11.5
MAKE OR BUY EVAL.	4.5	3.0	14.0	21.5	-7.5
EXPEDITING/RESCHEDULING	5.0	3.0	4.5	21.5	-17.0

PROGRAM OFFICE QUESTION 2
AFPRO QUESTION 4 TAU =-0.01 Z =-0.06

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.16

HYPOTHESIS 6, PROGRAM A. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE AFPRO ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.5	2.0	20.5	22.5	-2.0
*PRODUCTION FEASIBILITY	3.5	5.0	20.5	2.5	18.0
MILESTONES/MASTER SCHED.	4.0	4.5	10.5	7.0	3.5
MUL/PRIORITIES	2.5	2.0	26.0	22.5	3.5
MEMORANDUM OF AGREEMENT	4.0	4.0	10.5	12.5	-2.0
CONTRACT REQUIREMENTS	3.0	3.5	24.5	17.0	7.5
GOVT. FURN. PROPERTY	4.0	3.0	10.5	19.5	-9.0
PREAWARD SURVEYS	4.0	4.0	10.5	12.5	-2.0
SOURCE SELECTION	3.5	4.0	20.5	12.5	8.0
CONTRACTOR PROG. DOC.	4.0	3.0	10.5	19.5	-9.0
PROPOSAL EVALUATION	4.0	4.5	10.5	7.0	3.5
PRODUCIBILITY	4.0	5.0	10.5	2.5	8.0
PRODUCTION RISK ASSESS.	3.5	4.5	20.5	7.0	13.5
MFG. METHODS/TECHNOLOGY	4.0	3.5	10.5	17.0	-6.5
PRODUCTION READINESS	4.0	5.0	10.5	2.5	8.0
*ECP EVALUATION	4.0	2.0	10.5	22.5	-12.0
SURVEILLANCE/MONITORING	4.5	4.5	2.0	7.0	-5.0
MFG. MGMT. SYS/OPS EVAL.	4.0	4.5	10.5	7.0	3.5
SPECIAL SURVEYS/AUDITS	3.5	4.0	20.5	12.5	8.0
PROD. ASSESSMENT REPORTS	3.5	1.5	20.5	25.0	-4.5
STRIKE INFORMATION	4.0	4.0	10.5	12.5	-2.0
INTERCOMMAND SUPPORT	3.0	3.5	24.5	17.0	7.5
*POST AWARD ORIENTATION	4.0	1.0	10.5	26.0	-15.5
COST EXPENDITURE EVAL.	4.5	4.0	2.0	12.5	-10.5
MAKE OR BUY EVAL.	4.0	5.0	10.5	2.5	8.0
*EXPEDITING/RESCHEDULING	4.5	2.0	2.0	22.5	-20.5

PROGRAM OFFICE QUESTION 4
AFPRO QUESTION 2 TAU = 0.15 Z = 1.04

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.17

HYPOTHESIS 6, PROGRAM B. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE AFPRO ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	0.	4.0	25.0	12.5	12.5
PRODUCTION FEASIBILITY	4.0	4.7	6.5	4.0	2.5
MILESTONES/MASTER SCHED.	4.0	4.0	6.5	12.5	-6.0
MUL/PRIORITIES	4.0	3.0	6.5	21.0	-14.5
MEMORANDUM OF AGREEMENT	4.0	4.7	6.5	4.0	2.5
CONTRACT REQUIREMENTS	2.0	3.0	18.0	21.0	-3.0
GOVT. FURN. PROPERTY	3.0	3.0	14.0	21.0	-7.0
PREAWARD SURVEYS	4.0	4.3	6.5	7.5	-1.0
SOURCE SELECTION	1.5	2.0	21.5	23.5	-2.0
CONTRACTOR PROG. DOC.	4.0	4.0	6.5	12.5	-6.0
PROPOSAL EVALUATION	3.5	4.0	12.0	12.5	-0.5
PRODUCIBILITY	2.5	4.0	16.0	12.5	3.5
PRODUCTION RISK ASSESS.	4.0	4.7	6.5	4.0	2.5
MFG. METHODS/TECHNOLOGY	4.0	4.7	6.5	4.0	2.5
PRODUCTION READINESS	2.0	4.0	18.0	12.5	5.5
ECP EVALUATION	4.5	3.7	1.0	18.0	-17.0
*SURVEILLANCE/MONITORING	3.0	5.0	14.0	1.0	13.0
*MFG. MGMT. SYS/OPS EVAL.	2.0	4.7	18.0	4.0	14.0
SPECIAL SURVEYS/AUDITS	4.0	4.0	6.5	12.5	-6.0
PROD. ASSESSMENT REPORTS	1.5	4.3	21.5	7.5	14.0
STRIKE INFORMATION	0.	3.7	25.0	18.0	7.0
INTERCOMMAND SUPPORT	1.5	2.0	21.5	23.5	-2.0
POST AWARD ORIENTATION	0.	1.0	25.0	25.5	-0.5
COST EXPENDITURE EVAL.	1.5	4.0	21.5	12.5	9.0
*MAKE OR BUY EVAL.	4.0	1.0	6.5	25.5	-19.0
EXPEDITING/RESCHEDULING	3.0	3.7	14.0	18.0	-4.0

PROGRAM OFFICE QUESTION 4
AFPRO QUESTION 2 TAU = 0.24 Z = 1.69

* SIGNIFICANT DIFFERENCE IN RANKINGS.

TABLE K.18

HYPOTHESIS 6, PROGRAM C. COMPARISON OF TASK RANKINGS BY OPINION OF IMPORTANCE AFPRO ATTACHES

TASK DESCRIPTION	P.O. SCALE	AFPRO SCALE	P.O. RANK	AFPRO RANK	RANK DIFF.
GOVT. PROG. DOCUMENTATION	3.0	3.0	23.0	23.5	-0.5
PRODUCTION FEASIBILITY	5.0	4.5	3.0	5.5	-2.5
MILESTONES/MASTER SCHED.	3.5	3.5	20.0	20.0	0.
MUL/PRIORITIES	4.0	4.5	15.0	5.5	9.5
MEMORANDUM OF AGREEMENT	4.5	4.0	8.5	13.5	-5.0
CONTRACT REQUIREMENTS	4.0	4.5	15.0	5.5	9.5
GOVT. FURN. PROPERTY	4.5	3.5	8.5	20.0	-11.5
*PREAWARD SURVEYS	4.5	2.5	8.5	26.0	-17.5
SOURCE SELECTION	4.5	4.0	8.5	13.5	-5.0
CONTRACTOR PROG. DOC.	3.5	3.0	20.0	23.5	-3.5
PROPOSAL EVALUATION	2.5	4.0	25.5	13.5	12.0
PRODUCIBILITY	3.5	3.7	20.0	18.0	2.0
PRODUCTION RISK ASSESS.	4.0	4.0	15.0	13.5	1.5
MFG. METHODS/TECHNOLOGY	3.0	4.0	23.0	13.5	9.5
PRODUCTION READINESS	4.0	4.0	15.0	13.5	1.5
*ECP EVALUATION	2.5	4.5	25.5	5.5	20.0
SURVEILLANCE/MONITORING	4.5	5.0	8.5	1.5	7.0
MFG. MGMT. SYS/OPS EVAL.	5.0	4.5	3.0	5.5	-2.5
SPECIAL SURVEYS/AUDITS	4.0	4.3	15.0	9.0	6.0
PROD. ASSESSMENT REPORTS	4.5	3.5	8.5	20.0	-11.5
STRIKE INFORMATION	5.0	4.0	3.0	13.5	-10.5
INTERCOMMAND SUPPORT	5.0	4.0	3.0	13.5	-10.5
*POST AWARD ORIENTATION	3.0	4.5	23.0	5.5	17.5
*COST EXPENDITURE EVAL.	4.0	5.0	15.0	1.5	13.5
MAKE OR BUY EVAL.	4.0	3.0	15.0	23.5	-8.5
*EXPEDITING/RESCHEDULING	5.0	3.0	3.0	23.5	-20.5

PROGRAM OFFICE QUESTION 4
AFPRO QUESTION 2 TAU = 0.01 Z = 0.08

* SIGNIFICANT DIFFERENCE IN RANKINGS.

APPENDIX L

DETERMINATION OF RANK ORDER SIGNIFICANT DIFFERENCE

One of the objectives of the study was to identify differences in performed production management tasks between program offices and AFPROs. This discussion describes the methodology used to identify tasks whose rank differences contributed most to the disagreement between the two rank values, i.e., the disarray. This method was used to identify tasks with significantly different rank orders in each comparison of rankings.

The technique in a sense identifies the "outliers" at a specified level of probability.

The difference between rank scores is the basis for the computation of the Spearman rank order correlation coefficient (11:202-213). There is an inverse relationship between the sum of the absolute difference of rank scores and the correlation coefficient. The smaller the sum of the differences the higher is the correlation coefficient. The Kendall Tau computation views the difference between the ranks as representative of the number of interchanges in rank that would have to occur to arrive at a maximum correlation value (11:215). In either case, a large difference between the two rank scores contributes most to the disarray between the two ranks. However, the possible

magnitude of this difference is a function of the position on the "natural" rank order. A table was constructed that showed the number of combinations of difference between a "natural" rank order position and a possible observed difference (See Figure L.1).

For example, assume that the natural rank order of a task was the second position. There is one possible way to have a rank difference of Zero - the other rank score must be two also. There are two possible ways to observe a difference of one - the other rank score must be one or three. There is only one possible way to observe a rank difference of two - the other rank score must be four (the opposing rank cannot be less than one). The remainder of the table was constructed using the same logic. The maximum rank score was twenty-six and the maximum difference was twenty-five. It should be pointed out that if Tau were significant this distribution would not strictly hold.

A cumulative discrete probability diagram was computed using the table of possible combinations (See Figure L.2). The contribtuion of each observation to the probability of occurence was 1/N. The objective of the method was to identify the "outliers"; therefore, the cumulative probabilities of "greater than or equal to" values were computed for each natural order rank and possible observed difference.

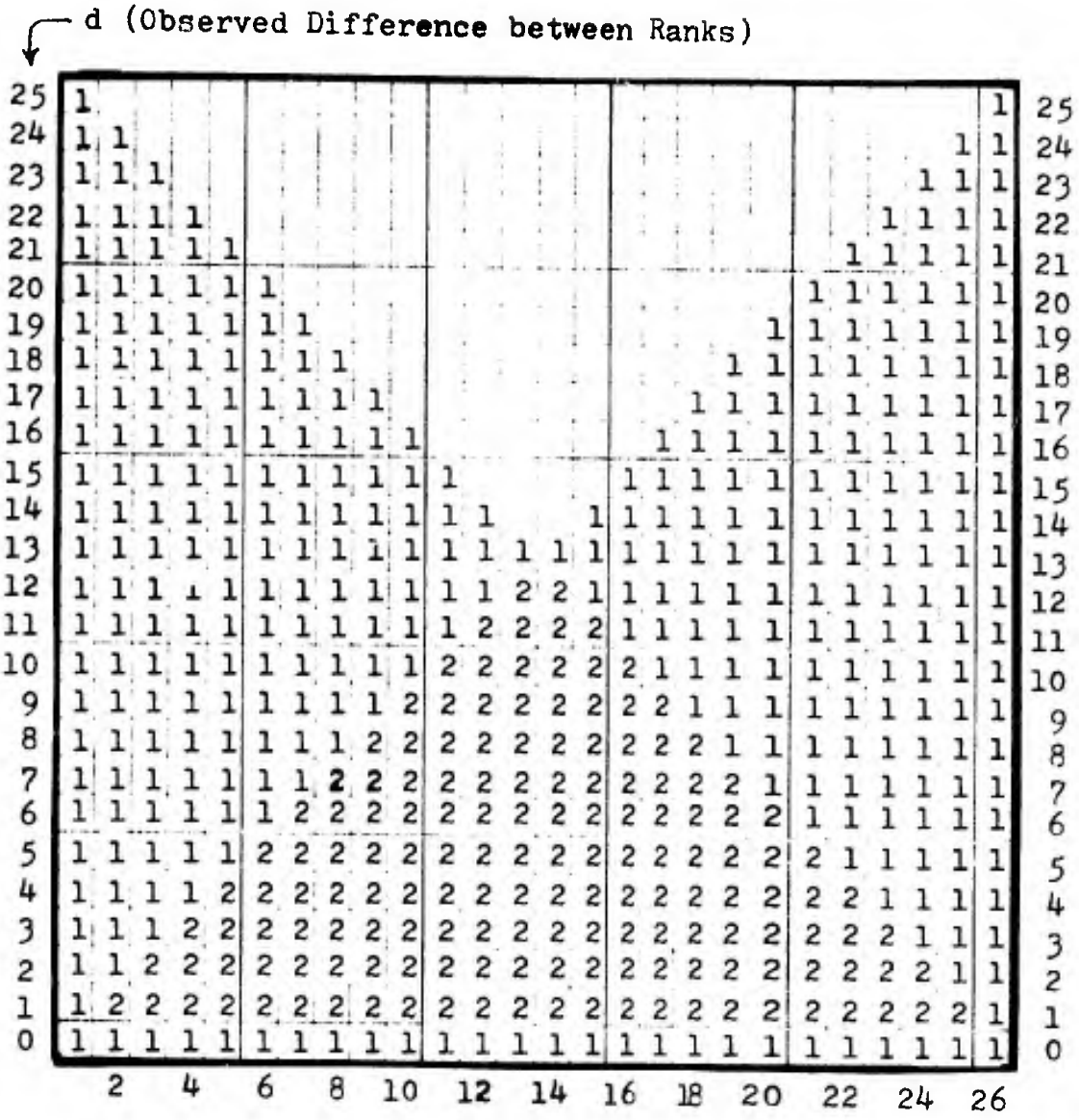

Figure L.1

Possible Combinations of Observed Rank Differences

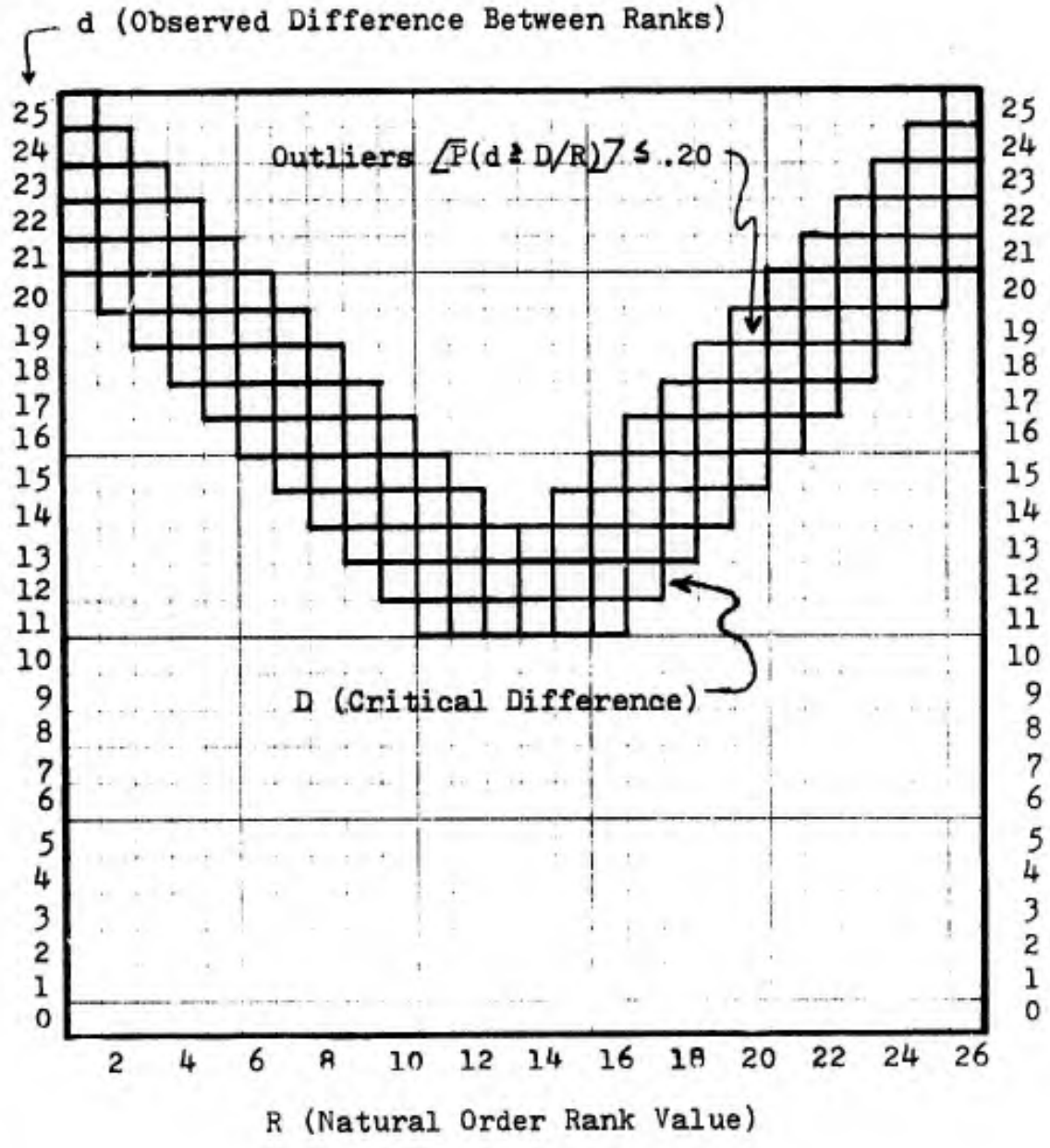

Figure L.2

Significant Differences in Observed Rank Values

"Outliers" were those tasks for which the probability of a difference in rank scores as great as that observed, given the position on the "natural" rank order and assuming no agreement between the rank orders, is equal to or less than 0.20. As can be observed by comparing the probability distribution and the possible combination tables, the magnitude of the difference is not a sufficient criterion to identify "outliers". The significance of the magnitude is a function of the placement within the "natural" rank order.

The sign of the difference is necessary to interpret the meaning of the difference. In this study, a "negative" difference indicated a higher program office ranking than the AFPRO ranking. A positive difference indicated a higher AFPRO ranking. Tasks meeting this significant difference criterion are identifed with an asterisk (*) on the tables in Appendix K.

APPENDIX M

TASK DIFFERENCES OBSERVED

This appendix consists of summary findings concerning each production management task included in the study. The order of presentation is the same as is used in Appendix K. The term "consistently" expresses agreement in terms of the sign of rank order differences among the three program offices or the three AFPROs. The term "significantly" refers to tasks identified by the criteria in Appendix L.

Government Program Documentation

Although not meeting the significant difference criteria in any instance, the AFPROs consistently overestimated the amount of time that the program offices spent on the preparation of government program documentation.

Production Feasibility

Program office C significantly underestimated both the time spent on and importance of production feasibility assessment to the AFPRO.

Milestones/Master Schedules

Program office A ranked the time spent on the establishment of milestones/master schedules significantly

higher than the AFPRO. Program office A also significantly underestimated the time spent by the AFPRO.

Master Urgency List (MUL)/Priorities

AFPRO B ranked the importance of MUL/priorities significantly lower than the program office. AFPRO C ranked the importance significantly higher than the program office.

Memorandum of Agreement

AFPROs consistently ranked time spent on memoranda of agreement higher than the program office although the rank differences were significant for Program C only. AFPRO C significantly overestimated the time spent by the program office.

Contract Requirements

AFPRO C ranked the importance of contract requirements significantly higher than the program office.

Government Furnished Property

Although not meeting the significant difference criteria, program offices consistently ranked the amount of time spent on government furnished property higher than the AFPROs. It was also observed that program office consistently overestimated the AFPRO's time ranking of the task. Program offices consistently ranked the importance of government furnished property higher than the AFPRO. For Program B there was a significant difference. Program

offices also consistently overestimated the importance of government furnished property to the AFPRO.

Preaward Surveys

Program office B significantly overestimated the time that AFPRO spent on preaward surveys. AFPROs A and C significantly underestimated the importance of preaward surveys to the program offices. The reverse was observed for program office B. Program office C significantly overestimated the importance of preaward surveys to the AFPRO.

Source Selection

AFPRO C significantly overestimated the importance of source selection to the program office.

Contractor Program Documentation

For Program A the program office ranking of time spent on contractor program documentation was significantly higher than the AFPRO.

All program offices consistently ranked the task higher in importance than the AFPROs. The AFPROs consistently underestimated the importance of the task to the program offices, with a significant difference observed on Program A. Program offices consistently overestimated the importance of the task to the AFPROs.

Proposal Evaluation

AFPRO C significantly underestimated the ranking

of time that the program office spent on proposal evaluation. All program offices consistently underestimated the AFPROs time rankings of proposal evaluation.

Producibility

There was no consistent or significant pattern of agteement or disagreement on the producibility task.

Production Risk Assessment

There was no consistent or significant pattern of agreement or disagreement on production risk assessment.

Manufacturing Methods/Technology

AFPRO C significantly overestimated the time spent on the task by the program office. For Program B, the AFPRO attached significantly more importance than the program office attached to the task.

Production Readiness

Program offices consistently ranked their time expenditures on production readiness higher than AFPROs. For Program C, there was a significant difference in rankings. AFPROs consistently underestimated the time program offices spent, and on Program C there was a significant difference. Program offices consistently overestimated the time AFPROs spent. AFPROs consistently overestimated the importance that the program offices attached and in the case of Program A, significantly overestimated the importance.

Engineering Change Proposal (ECP) Evaluation

AFPRO A significantly underestimated the time that the program office spent on ECP evaluation and the importance to the program office. Program office C significantly underestimated the time that the AFPRO spent on ECP evaluation.

Surveillance/Monitoring

AFPRO C ranked its time spent on surveillance/monitoring significantly higher than the program office. Program office B significantly underestimated the importance that the AFPRO attached to the task.

Manufacturing Management Systems/Operations Evaluation

AFPROs consistently ranked the time spent on this task significantly higher than the program offices. AFPROs also consistently ranked the importance of the task higher than the program offices. AFPRO B ranked the importance significantly higher than the program office. Program office B significantly underestimated both the time and importance rankings of the task to the AFPRO. However, AFPRO C significantly underestimated the importance of the task to the program office.

Special Surveys/Audits

AFPRO rankings of time and importance of special surveys/audits were consistently higher than the program office rankings. AFPROs also consistently overestimated

the importance and time rankings of the task to the program offices.

Production Assessment Reports

AFPROs consistently ranked the amount of time spent on production assessment reports consistently higher than the program offices. For Programs B and C, there was a significant difference in rankings. AFPRO B and Program Office B significantly underestimated the amount of time each other spent.

Strike Information

There was no consistent or significant pattern of agreement or disagreement for this task.

Intercommand Support

Program office B ranked the amount of time spent on and the importance of the task significantly higher than did the AFPRO. AFPRO B significantly underestimated the importance of the task to the program office.

Post Award Orientation

AFPRO C ranked the importance of post award conferences higher than the program office and the program office significantly underestimated the importance of the task to the AFPRO. Program office A significantly overestimated the importance of the task to the AFPRO.

Cost Expenditure Evaluation

AFPRO C time and importance rankings of cost expenditure evaluation were significantly higher than the program office. All AFPROs consistently overestimated the importance of the task to the program offices with AFPROs B and C overestimating significantly. Program office C significantly underestimated the importance of the task to the AFPRO.

Make or Buy

All program offices consistently ranked the importance of make or buy higher than the AFPROs. Program office B ranked the task significantly higher. AFPROs consistently underestimated the importance of the task to the program offices. Program office B significantly overestimated the importance of make or buy to the AFPRO.

Expediting/Rescheduling

Program office A significantly overestimated the time spent on expediting/rescheduling by the AFPRO. All program offices ranked the task consistently higher in importance than the AFPROs. Program offices A and C ranked the task significantly higher than the AFPROs and they also significantly overestimated the importance of expediting/rescheduling to the AFPROs.

SELECTED BIBLIOGRAPHY

A. REFERENCES CITED

1. Chase, Richard B., and Nicholas J. Aquilano. Production and Operations Management: A Life Cycle Approach. Homewood, Ill.: Richard D. Irwin, Inc., 1973.

2. Engan, Captain James A., USAF, and Captain Robert E. Hergenroeder, USAF. "An Exploration into the Practices of DCAS Industrial Specialists in Obtaining Information on High Priority, Medium Value Contracts." Unpublished master's thesis, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, 1968.

3. Hood, Joseph L. "Confusion: A Cause of Criticism of the Contracting Officer." National Contract Management Journal, VI No. 2 (Spring, 1972), pp. 33-49.

4. Hudson, Major General John B., USAF, and Major General Joseph J. Cody, Jr., USAF. "Memorandum of Understanding." (Between Air Force Systems Command and Defense Supply Agency.) Washington, D.C., 6 September 1973.

5. Kendall, Maurice G. Rank Correlation Methods. 2d ed. New York: Hafner Publishing Company, 1955.

6. Packard, David. Deputy Secretary of Defense. Memorandum, subject: Improvement in Weapon Systems Acquisition. 31 July 1969.

7. _____. Deputy Secretary of Defense. Memorandum, subject: Policy Guidance on Major Weapon System Acquisition. 28 May 1970.

8. Potts, Commander Stanley W., USN, and Captain Robert L. Mollwitz, USAF. "Uniform Contract Management of Production and Industrial Resources." Unpublished master's thesis, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, 1963.

9. Schultz, Colonel Paul G., USAF. Chief, Production Management Division, Directorate of Development and Production Policy, Air Force Systems Command. Washington, D.C. Memorandum. 14 November, 1974.

10. _____. Chief, Production Management Division, Directorate of Development and Production Policy, Air Force Systems Command. Washington, D.C. Telephone interview. 6 December 1974.

11. Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill Book Company, Inc., 1956.

12. Stormo, Captain Douglas D., USAF, and Captain James R. Heitz, USAF. "A Comparative Study of the Functional Relationship Between the Air Force Plant Representative Office and the System Program Office in Defense System Acquisition." Unpublished Master's thesis, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, 1972.

13. U. S. Air Force Systems Command, Air Force Contract Management Division (AFSC). Management Systems Indicators. Kirtland AFB, New Mexico, 1974.

14. U. S. Air Force Systems Command. Air Force Production Management Study. Volumes I - II. Washington, D. C., 1971.

15. U. S. Air Force Systems Command. Production Management. AFSCM 84-3. Washington, D.C., 14 May 1971.

16. U. S. Air Force Systems Command. Production Readiness Review. AFSCR 84-2. Washington, D.C., 23 November 1971.

17. U. S. Department of the Air Force. Air Force Systems Command. AFR 23-8. Washington: Government Printing Office, 1971.

18. U. S. Department of the Air Force. Program Management. AFR 800-2. Washington: Government Printing Office, 1972.

19. U. S. Department of the Air Force. Production Management in the Acquisition Life Cycle. AFR 800-9, 25 April 1973. Washington: Government Printing Office, 1973.

20. U. S. Department of the Air Force. Sixty Years of Contract Management. AFSC 67-80-1. Washington, D. C., 1967.

21. U. S. Department of Defense. Production Management. MIL-STD-1528. Washington: Government Printing Office, 1972.

22. Whittaker, Philip N. Assistant Secretary of the Air Force (Installations and Logistics). Memorandum, subject: Production Management, 31 March 1970.

23. Wolman, Benjamin B. Dictionary of Behavioral Science. New York: Van Nostrand Reinhold Co., 1973.

24. Wright, Major Ronald D., USAF. Letter, concerning production management task list, to the authors, 21 April 1975.

B. RELATED SOURCES

Ballard, Colonel John C., Jr., USAF. "Air Force Contract Management in Weapons System Acquisition: A Parochial View." Unpublished report, Industrial College of the Armed Forces, 1972.

Campbell, William Giles and Stephen Vaughan Ballou. Form and Style: Theses, Reports, Term Papers. 4th ed. Boston: Houghton Mifflin Company, 1974.

Krejci, Lieutenant Colonel Ronald J., USAF. "The Evolution of Weapon Systems Management and Its Effect on the System Program Office." Unpublished report, Air War College, Air University, 1972.

National Security Industrial Association. Defense Acquisition. Washington, D.C., 1970.

Schenk, John A. "Planned Evolution: An Examination of Defense Contract Administration Services (DCAS) in Relation to the Changing Defense Environment." Unpublished thesis, Naval War College, Newport, R.I., 1972.

U. S. Department of the Air Force, Air Force Systems Command. Rejection Control Program for GFAE. AFSC/AFLCR 74-7. Washington, D.C., 1973.

U. S. Air Force Systems Command. Program Management. AFSCR 800-2. Washington, D.C., 1972.

U. S. Air Force Systems Command. Program Office/AFPRO Cadre. AFSCR 800-9. Washington, D.C.

U. S. Air Force Systems Command. Organization and Function: Headquarters Air Force Systems Command. AFSCR 23-1. Washington, D.C., 1972.

U. S. Air Force Systems Command. Aeronautical Systems Division. AFSCR 23-3. Washington, D.C., 1972.

U. S. Air Force Systems Command. Air Force Contract Management Division. AFSCR 23-16. Washington, D.C., 1973.

U. S. Air Force Systems Command. A Guide for Program Management. AFSC Pamphlet 800-3. Washington, D.C., 1971.

U. S. Department of the Air Force, Contract Management in Major Program Acquisition. AFR 70-16. Washington: Government Printing Office, 1974.

U. S. Department of the Air Force. Contractor Labor-Management Relations Activities. AFR 78-1. Washington: Government Printing Office, 1967.

U. S. Department of the Air Force. Emergency Priorities and Allocation Manual. AFM 78-5. Washington: Government Printing Office, 1958.

U. S. Department of the Air Force. Industrial Preparedness Planning. AFR 78-13. Washington: Government Printing Office, 1972.

U. S. Department of the Air Force. Manufacturing Technology Program. AFR 78-3. Washington: Government Printing Office, 1972.

U. S. Department of the Air Force. Reporting Labor-Management Disputes and Impact Affecting Air Force Programs or Operations. AFR 78-10. Washington: Government Printing Office, 1967.

U. S. Department of the Air Force. Reports on Production of Aircraft, Missiles, and Engines (RCS-HAF-RDG(M)-7102). AFR 84-8. Washington: Government Printing Office, 1974.

U. S. Department of the Air Force. Priorities and Allocations Manual. AFM 78-4. Washington: Government Printing Office, 1961.

U. S. Department of the Air Force, School of Systems and Logistics, Air Force Institute of Technology (AU). Style and Guidelines Manual for Thesis and Technical Reports. Fifth Revision. Wright-Patterson AFB, Ohio, June, 1975.

U. S. Department of Defense. Acquisition of Major Defense Systems. DOD Directive 5000.1. Washington: Government Printing Office, 1971.

U. S. Department of Defense. Industrial Preparedness Planning Manual. DOD Manual 4005.3M. Washington: Government Printing Office, 1972.

U. S. Department of Defense. Configuration Control-Engineering Changes, Deviations and Waivers. MIL-STD-480. Washington: Government Printing Office, 1968.

Wayman, Captain David S., USAF. "The Objectives of the F-15 Production Management Function for the Production Phase." Unpublished study, Wright-Patterson AFB, Ohio, 1973.

BIOGRAPHICAL SKETCHES OF THE AUTHORS

Major William K. Goss, USAF, [redacted] He received a Bachelor of Science from Montana State University in 1961 and a Master of Science from the University of Arizona in 1963, both in Agricultural Economics. Commissioned through ROTC in 1961, he served from 1962 to 1967 as a data processing officer. From 1968 to 1972 he served as a production officer in the Navy/Air Force F/RF-4 project office. His last duty was as a Contracting Officer in the F/RF-4 System Program Office, Wright-Patterson AFB, Ohio. His next assignment will be to AFCMD Detachment 36, Culver City, California.

Major Lyle W. Lockwood, USAF, [redacted] He received his Bachelor of Science in Forestry and his commission through ROTC from Purdue University in 1963. His first Air Force assignment was as a production officer at AFCMD Detachment 13, AFPRO, Sunnyvale, California. His next duty was an AFIT/EWI student at the Boeing Company, Seattle, Washington. He then served as a quality control officer at AFCMD Detachment 6, AFPRO, Indianapolis, Indiana. His assignment until his assignment to AFIT/SLG was Chief, Quality Assurance Branch, Deputy for F-15/JEPO, ASD (AFSC). His next assignment will be to the Air Force Business Research Management Center, HQUSAF, WPAFB, Ohio.