

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

LEVEL II

12

AD A 092370

78 19 REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFOSR TR-80-1176	2. GOVT ACCESSION NO. AD A092370	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Strategies for Improving U.S. Air Force Productivity: Developing Methodologies for Assessing the Potential Relationship between Communication Behaviors and Productivity		5. TYPE OF REPORT & PERIOD COVERED FINAL 01 Jun 79 - 31 May 80
6. AUTHOR(s) Richard Huseman William Boulton		7. CONTRACT OR GRANT NUMBER(s) F49620-79-C-0081
8. PERFORMING ORGANIZATION NAME AND ADDRESS University of Georgia Department of Management Athens, Georgia 30602		9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 61102F 2313/A3
10. CONTROLLING OFFICE NAME AND ADDRESS Air Force Office of Scientific Research (NL) Bolling AFB DC 20332		11. REPORT DATE 11 SEP 1980
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Final rept. 1 Jun 79 - 31 May 80		12. NUMBER OF PAGES 89
13. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		13. SECURITY CLASS. (of this report) Unclassified
14. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) Approved for public release; distribution unlimited.		14. DECLASSIFICATION/DOWNGRADING SCHEDULE
15. SUPPLEMENTARY NOTES		
16. KEY WORDS (Continue on reverse side if necessary and identify by block number) Communication Individual Work Performance Job Characteristics Maintenance Technician Performance Productivity		
17. ABSTRACT (Continue on reverse side if necessary and identify by block number) The project was a preliminary testing of a model that specified the relationship between the content of communication and individual work performance of Air Force maintenance specialists. The model states that content of communication is in general positively related to individual work performance; however the specific content of communication is modified by characteristics of the work being performed. That is performance on jobs with differing		

FILE COPY

DTIC ELECTE
DEC 02 1980
E

412 070

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

characteristics should be related to different combinations of communication content rather than one set of communication content dimensions being equally applicable to all work activities.

The project developed measures of individual work performance, seven factors of communication content, and seven measures of work characteristics. These were evaluated according to response patterns, factor structure, and/or reliability indicants.


Preliminary testing supported the model. In general correlational analyses indicated that the content and frequency of supervisory communication with maintenance technicians was positively related to individual overall job performance. Moderated regression analyses indicated different job characteristics supporting the tenet that communication content should be modified according to the characteristics of the work activity. These analyses also indicated the importance of peer work group communication for jobs characterized by high levels of interaction and autonomy.

It is thought that further testing should be undertaken to determine if groups of similar jobs can be identified and appropriate combinations of communication content be identified for each group of similar jobs.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

**STRATEGIES FOR IMPROVING
U.S. AIR FORCE PRODUCTIVITY:
Developing Methodologies for Assessing
the Potential Relationship between
Communication Behaviors and Productivity**

Accession For	
NTIS GRA&I	
DDC TAB	
Unannounced Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or special
A	

by

Dr. Richard Huseman Dr. Robert Gatewood
Dr. William Boulton Dr. John Hatfield.

Department of Management
University of Georgia
Athens, Georgia 30602

for

U.S. Air Force Office of Scientific Research
Life Sciences Directorate
Bolling AFB, DC 20332

F49620-79-C-0081
Dr. Alfred R. Fregly, Program Manager

FINAL SCIENTIFIC REPORT

September 1, 1980

Approved for public
distribution

UNCLASSIFIED

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFSC)
NOTICE OF TRANSMITTAL TO DDC
This technical report has been reviewed and is
approved for public release IAW AFR 190-12 (7b).
Distribution is unlimited.
A. D. BLUM
Technical Information Officer

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iv
LIST OF TABLES	v
STATEMENT OF WORK	1
Background -- The Conceptual Framework	2
The Communication Matrix	3
Communication Formats	5
Interaction Participants	7
The Communication-Productivity Model	7
Objectives of the Research	10
Scope of the Research	11
RESEARCH INSTRUMENTS AND OPERATIONS	11
Phase I - Clinical Interviews	12
Results of the Interviews	12
Phase II - Identifying and Operationalizing Variables	15
Communication	15
Productivity	20
Moderator Variables	22
Phase III - Testing the Conceptual Framework	24
Sample	24
Procedures	27
DATA RESULTS AND DISCUSSION	28
Instrument Development	29
Performance Measures	29
Communication Factors	34
Moderator Variables	46
Preliminary Testing of Communication - Productivity Model	50
SUMMARY	62
REFERENCES	64
APPENDICES	67
A. Communication Assessment Package (Part A)	67
B. Communication Assessment Package (Part B)	76
C. Supervisor's Questionnaire	83
D. List of DAFSC's and Tasks	87

LIST OF FIGURES

	Page
1. Matrix of Communication Components	6
2. The Communication Behavior-Productivity Model	8
3. Variables Investigated at the Job Level	25
4. Variables Investigated at the Task Level	26

LIST OF TABLES

	Page
1. Breakdown of Sample by Base and Squadron	27
2. Work Performance Scales Means and Standard Deviations	31
3. Intercorrelations Among Performance Scales	32
4. Reliability Estimates for Performance Scales	33
5. Supervisor - Subordinate Job Communication Factor Structure Matrix	36
6. Supervisor - Subordinate Task Communication Factor Structure Matrix	38
7. Written Communication - Job and Task Factor Structure Matrices	40
8. Job Communication Scale Means and Standard Deviations	43
9. Task Communication Scale Means and Standard Deviations	44
10. Written Communication Scale Means and Standard Deviations	45
11. Moderator Scale Means and Standard Deviations	48
12. Frequency Distribution of Selected Job Moderator Scales	49
13. Frequency Distributions of Selected Task Moderator Scales	51
14. Intercorrelations Among Job Moderator Scales	52
15. Intercorrelations Among Task Moderator Scales	53
16. Intercorrelations Between Communications Scales and Overall Job Performance	55
17. Intercorrelations Between Communication Scales and Overall Task Performance	56
18. T-tests Results of Moderated Regressions for Job Performance	58
19. T-test Results of Moderated Regressions for Task Performance	61

STATEMENT OF WORK

Overview

Management Theory and research is replete with attempts to develop methods for enhancing worker productivity. From 1971 to 1975 alone, more than 100 studies appeared in major journals describing research into strategies for effecting some favorable change in employee behavior (Katzell, Bienstock, and Faerstein, 1977). These studies often broadened the conventional meaning of the term "productivity" (i.e., the ratio of outputs to inputs) into performance variables such as quality of work, absenteeism, and turnover, indicating an ongoing search for strategies to impact a broad base of worker behavior.

Clearly, this interest in productivity improvement is not limited to the private sector. There has been a continuing interest within a number of U.S. Air Force operations researching various aspects of productivity. Among them:

1. The Air Force Academy's Behavioral Science and Leadership Department motivation studies,
2. The Air Force Institute of Technology's job enrichment studies,
3. The Air Force Military Personnel Center's development of officer evaluation reports,
4. The Air Force Directorate of Personnel Plan's Human Resources Development laboratories,
5. The Leadership Management Development Center's (LMDC) problem solving support,
6. The Logistics Management Center's (LMC) efforts to improve Air Force policies.

This study drew upon work from both published management literature and Air Force research units in its conceptualization and development.

One concept receiving considerable attention in the productivity research is communication. For example, some studies have investigated the performance effects of broader communication constructs such as networks (Schuler and Blank, 1976; Tushman, 1978) and channels (Pacilio, 1977). Others have focused on narrower constructs such as feedback about performance (Hundal, 1969; Migliore, 1970; Kim and Hamner, 1976), participation in decision-making (Bragg and Andrews, 1973; Latham and Yukl, 1976), and goal-setting (Wexley and Nemeroff, 1976; Kim and Hamner, 1976). Obviously, approaches investigating the communication-productivity relationship are diverse. But the objective in each approach has been to identify or test specific communication constructs which are empirically tied to worker productivity.

The overriding objective of this study was to test one approach to investigating the communication-productivity relationship in the Air Force setting -- the Communication Content Approach. Briefly, the study examined the relationship between the content of messages Air Force personnel send and receive and productivity. Also investigated was the impact of selected work and organization variables on this proposed communication-productivity relationship.

Background -- The Conceptual Framework

This study was designed around a conceptual framework (Huseman, Hatfield, and Gatewood, 1978; Huseman, Hatfield, Boulton, and

Gatewood, 1980) for analyzing the communication-productivity relationship. The framework consists of: (1) a matrix delineating components of communication presumed related to productivity, and (2) a model of the communication-productivity relationship.

1. The Communication Matrix. A major problem in developing a conceptual framework to study the communication-performance relationship is the absence of a comprehensive but manageable description of communication. Most communication models (e.g., Shannon and Weaver, 1949; Berlo, 1960) specify that communication has at least four components: source, receiver, channel, and message. Thus, at the most basic level, an individual can be either sender or receiver in relation to many other communicators (e.g., supervisor, work group peers, subordinates), using various oral and written channels to transmit a variety of work related and non-work related messages.

Of the basic components, perhaps the most difficult to extrapolate from general communication theory to an organizational context is the message itself. It also seems, conceptually, to be the characteristic that is the most closely related to work performance. Most message taxonomies rely on conjecture rather than empirical research. Likert (1961), for example, posits two general areas of communication content: (1) cognitive material (e.g., information, ideas, suggestions, experiences; and (2) motivational and emotional material (e.g., attitudes, hostilities, support, appreciation, goals). Katz and Kahn (1978) expand this notion of communication content in terms of the direction of information flow. They suggest that downward communication contains

five types of information: (1) job instructions, (2) job rationale, (3) procedures and practices, (4) performance feedback, and (5) indoctrination of goals. They reduce upward communication to what subordinates say about: (1) themselves, their performance, and their problems, (2) others and their problems, (3) organizational practices and policies, and (4) what needs to be done and how it can be done. Horizontal communication provides: (1) task coordination, and (2) emotional and social support.

One empirically based taxonomy of message types is Hatfield's (1976) category system for analyzing superior-subordinate interactions. After analyzing tape recordings of superior-subordinate and peer interactions in actual work settings, he identified forty-six communication content categories which were classified into the following five message types: (1) Direction (task performance information); (2) Information (neutral, as opposed to evaluative, information about the work context); (3) Rationale (reasons or justification); (4) Evaluation (feedback); and (5) Expression (personal, non-task related messages).

Using Hatfield's five message types and the forty-six communication content categories, Huseman et al. (1980) developed a fifty-six item questionnaire to assess the communication between target individuals and their immediate supervisors. Arranged to reflect the five message types (Direction--13 items, Information--12 items, Rationale--8 items, Evaluation--10 items, Expression--13 items), the questionnaire was administered to 646 hourly employees in five private sector organizations. Factor analysis of questionnaire responses identified not five, but seven message types:

1. Direction: Messages focusing upon task performance (e.g., job instructions, deadlines, objectives).
2. Information: Messages providing neutral (as opposed to evaluative) information about the work context (e.g., rules and policies, future plans for the company or work group).
3. Rationale: Messages providing reasons or justification for specific work activities, ideas, or opinions.
4. Participation: Messages containing either solicited or volunteered task-related input from the target individual (e.g., supervisor asks for opinions, individual makes suggestions).
5. Feedback: Messages containing evaluation of the target individual's work, relations with others, attitude toward work, and promotion opportunities.
6. Positive Expression: Messages containing "small talk" (e.g., casual conversations about interests outside of work).
7. Negative Expression: Messages having direct implications for the superior-subordinate relationship (e.g., ridicule, criticism in front of others).

These message types are the core components of the Communication Matrix in Figure 1.

Communication Formats in Figure 1 include both context and channel of communication. The two contexts, "dyadic" and "group," refer respectively to two-person communication (e.g., face-to-face interaction, telephone conversations) and communication involving more than two interactants (e.g., informal triadic discussions, regularly scheduled group meetings). Among the channels, "written" includes such media as memoranda, technical manuals, and house organs, while "verbal" and "nonverbal" distinguish between the actual words transmitted and nonverbal facets of the message (e.g., paralanguage, kinesics).

FIGURE 1
Matrix of Communication Components

MESSAGE TYPES

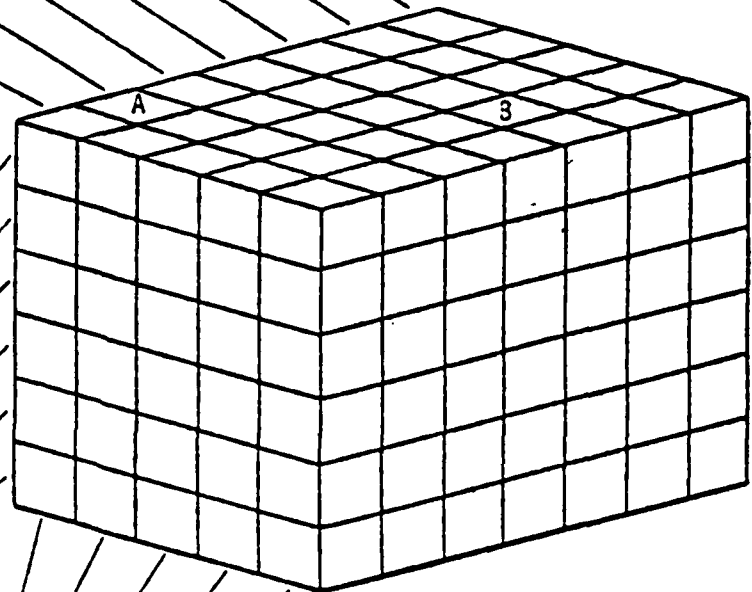
- Direction
- Information
- Feedback
- Participation
- Rationale
- Positive Expression
- Negative Expression

COMMUNICATION FORMATS

- Dyadic Verbal
- Dyadic Nonverbal
- Dyadic Written
- Group Verbal
- Group Nonverbal
- Group Written

INTERACTION PARTICIPANTS

- Immediate Supervisor
- Subordinates
- Work Group Peers
- Direct Higher Management
- Other Employees



Interaction Participants in the figure denotes possible interactants who might communicate with the target individual. "Direct Higher Management" refers to someone other than the immediate supervisor in direct line of authority above the individual. "Other Employees," then, includes not only individuals in higher management not having direct authority over the individual, but also peers and subordinates outside the individual's work group.

Inspection of Cell A in the matrix should help clarify the relationships among the three components. If the target individual were to receive a message located in this cell, it would be verbal and non-task related communication emanating from the immediate supervisor. In Cell B, received communication would also be dyadic verbal but would contain evaluative information from someone in direct, higher management.

The Huseman et al. model (1980) was limited in scope. First, it identified the seven message types based upon an analysis of only superior-subordinate communication. The present study expanded this analysis to include peer communication as well. Second, the Huseman et al. study focused only upon verbal communication. In this study both verbal and written communication were investigated.

2. The Communication-Productivity Model. In its most general sense, the relationship between communication and productivity is one in which communication acts as the independent variable effecting some change in productivity.¹ The model in Figure 2 depicts that relationship.

¹Clearly, the variable roles can be reversed. An individual's level of productivity can affect the kind of communication he or she receives.

COMMUNICATION	MODERATING VARIABLES			PRODUCTIVITY
	<u>Individual Characteristics</u>	<u>Work Characteristics</u>	<u>Organizational Characteristics</u>	
Interaction Content Categories	Education	Skill Variety	Organizational Size	Quantity of Output
Interaction Contexts	Experience	Identity	Span of Control	Quality of Output
Interaction Participants	Personal Goals	Significance	Supervisory Style	Absenteeism
	Work Related Attitude	Autonomy	Rate of Internal Change	Turnover
		Feedback		Tardiness
				Satisfaction
				Motivation

Figure 2. The Communication Behavior-Productivity Model

First, communication is limited to the three components in the Communication Matrix. Specifically, it refers to the content of messages an individual sends and receives (i.e., the seven message types). This focus on message content: (1) is consistent with much of the previous research into the communication-productivity relationship (e.g., Sorcher, 1969; Migliore, 1970; Adam, 1975); and (2) provides a viable means for introducing specific changes in communication and testing their effects on productivity in Air Force settings.

Second, productivity is conceptualized as any aspect of the individual's work performance. This definition has been enlarged from simple ratio of outputs to inputs in order to include factors investigated in previous productivity studies, factors such as quality of work (Ivancevich, 1974; Adam, 1975); absenteeism (Powell and Schlacter, 1971; Bragg and Andrews, 1973; Wexley and Nemeroff, 1975); turnover (Latham and Kinne, 1974; Hautaluoma and Gavin, 1975); and overall organizational performance (Schuler and Blank, 1976). Also, practicing managers are frequently interested in much more than quantity of work when assessing productivity (Katzell and Yankelovich, 1975). Thus, the performance variables in Figure 2 merely illustrate important organizational effectiveness criteria to which communication might be related.

Third, it is unlikely that a uniform set of message types would predict to performance across all tasks, organizations, and individual workers. For example, communication patterns related to the performance of Air Force enlisted airmen working in a steady-state environment would likely be different than patterns

of communication related to the performance of officers in an R&D laboratory of a rapidly changing organization. This assumption is supported by previous research (e.g., Latham and Yukl, 1976; Sashkin, 1976; Schuler and Blank, 1976; Poole, 1978). Thus, the model shows the communication-performance relationship to be moderated by representative variables within the individual, work group, and organization.

This conceptual framework, composed of the Communication Matrix and the Communication-Productivity Model, provided the basic theoretical structure for the present study.

Objectives of the Research

The primary purpose of this study was to investigate the relationship between communication and performance in the Air Force setting. The specific study objectives were:

1. Through clinical interviews with selected Air Force personnel, to identify operations where productivity research is most needed.
2. Identify and operationalize three classes of variables:
 - a. work performance dimensions at both the group and individual level.
 - b. task and non-task communication dimensions at both the work group and individual level.
 - c. dimensions of both the individual's job and specific tasks that affect the relationship between the communication and performance variables.
3. Use the products of 1 and 2 above to undertake limited testing of the conceptual framework described earlier.
4. Perform appropriate data analyses to isolate the relationship between communication and productivity.

Scope of the Research

The study was carried out in the maintenance squadrons at three Air Force bases in the southeastern United States. The unit of analysis was the first level maintenance specialist.

Specific variables examined were:

1. Communication:

- a. Communication between the specialist and his or her immediate supervisor.
- b. Communication between the specialist and his or her work group peers.
- c. The specialist's use of written documents (e.g., technical manuals) in performing his or her work.

2. Performance:

- a. The specialist's quantity of work.
- b. The specialist's quality of work.
- c. The specialist's overall performance.

3. Moderators:

- a. Specific characteristics (e.g., autonomy, interdependence) of the specialist's job.
- b. Specific characteristics (e.g., autonomy, interdependence) of the single task the specialist performed most frequently while on the job.

RESEARCH INSTRUMENTS AND OPERATIONS

The study was carried out in three phases. Phase I involved the first objective -- identifying operations where productivity research was most needed. Phase II fulfilled the second objective -- identifying and operationalizing the three classes of variables. In Phase III the third and fourth objectives were completed --

data were gathered and analyzed to test the conceptual framework.

Phase I -- Clinical Interviews

In this phase of the study, members of the research team conducted interviews with USAF personnel involved in both the operating and productivity research areas. Interviews were structured so as to obtain answers to the following questions:

1. What operations are most in need of productivity research?
2. What criteria can be used to measure organizational productivity?
3. What methodology will be most applicable in measuring high and low productivity of operating units?
4. What criteria can be used to measure individual productivity?
5. What methodology will be most applicable in measuring high and low productivity of individuals?

Interviews were conducted at the three bases cooperating in the study (Eglin AFB, Hurlburt Field, and Moody AFB), as well as at the Occupational Research Division at Brooks AFB and the Advance Systems Division at Wright Patterson AFB. A wide range of operating and research personnel was interviewed in order to enhance the representativeness of interview findings.

Results of the Interviews. Although respondents provided a diversity of specific information helpful to the study, several general conclusions were drawn from their comments:

1. The maintenance function at the three bases was in most need of productivity research. Clearly, respondents felt that maintenance was a central function in the

readiness mission common to the three participating bases.

2. Written communication, especially in the form of technical manuals, technical orders, and regulations, was considered to be an important contributor to a maintenance specialist's performance. Thus, the relationship between a specialist's use of written documents and the specialist's productivity was investigated.
3. Although communication was a subsidiary part of past and current USAF research efforts, no studies conducted in Air Force settings to date had attempted to link communication content (as described in the Communication Matrix) with the performance of Air Force personnel. This study was apparently a "first" in exploring the communication-productivity relationship.
4. Few "hard" measures of performance suitable for project analyses existed for either groups or individuals. Respondents indicated that records were kept concerning such criteria as the amount of time an aircraft was grounded or the amount of time an individual specialist required to complete maintenance (especially repair) tasks. However, for scientific purposes, these measures were subject to contaminating influences, such as the immediate availability of materials, interruptions, and the joint performance of tasks by persons from more than one work group. For example, time logs for an individual maintenance specialist's task performance might be somewhat

inaccurate because: (a) for one task needed materials were at hand while, on another task, materials had to be obtained; or (b) the specialist might be moved from a low priority task to a high priority task, then back to the low priority task again; or (c) the specialist might seek and get help from someone else (inside or outside the work group) in performing a task. In short, while "hard" measures of performance exist, their usefulness for a scientific study is questionable.

5. Currently used "soft" measures of performance (e.g., APRs) are of questionable scientific validity because most of the ratings are inflated. This inflation is probably caused by the direct implications of the ratings on future promotion decisions. Such ratings, then, would:
 - (a) not accurately show actual performance levels, and
 - (b) contain little variance.
6. Two measurable characteristics of performance that emerged from the interviews were quantity and quality of work. For respondents, quantity seemed to include at least two factors: amount of output and time used to complete a task. Quality included number of errors made, number of errors repeated, and the results of operational checks of work.

These six major conclusions had significant impact on the design of the study. As will become evident later, other suggestions offered during the interviews were incorporated into the study as well.

Phase II -- Identifying and Operationalizing Variables

The purposes of this Phase of the study were to determine what specific communication, productivity, and moderator variables should be investigated and to operationalize the variables selected. This section of the report will be organized around these three sets of variables.

1. Communication. The conceptual framework described earlier posits seven message types (Direction, Information, Rationale, Participation, Feedback, Positive Expression, and Negative Expression) relate to the productivity of target individuals. The Communication Matrix proposes that these message types exist in the individual's interactions with superiors, subordinates, peers, direct higher management, and other employees, and that the message types may occur in verbal, nonverbal, or written form.

In this study, the following communication factors were investigated:

<u>Message Types</u>	<u>Communication Formats</u>	<u>Interaction Participants</u>
Direction	Dyadic Verbal	Supervisor
Information	Dyadic Written	Work Group Peers
Rationale	Group Verbal	Direct Higher Management
Participation	Group Written	
Feedback		
Positive Expression		
Negative Expression		

Specifically, the factors were examined as follows:

1. The seven message types, the four communication formats, with the supervisor as interaction participant.

2. The seven message types, the four communication formats, with work group peers as interaction participants.
3. Three message types (Direction, Information, Rationale), the group written format, and direct, higher management as interaction participant.

The study expanded upon previous research in two ways. First, it examined the effects of written communication, following one suggestion made by interview respondents in Phase I. This focus is reflected in point three above. Because it was presumed that technical manuals or technical orders (the written sources deemed important by respondents) would not typically contain all seven message types, only the three listed above were included in this investigation of written communication.

Second, the study investigated the target individual's communication with work group peers. While much of the practitioner-oriented management literature (cf., McGregor, 1960; Haire, 1964; Leavitt, 1972; Davis, 1978) views the supervisor or manager as the major force in shaping worker behavior, ample research in group dynamics (cf., Golembiewski, 1965; Cartwright and Zander, 1968; Shaw, 1974; Hackman, 1976) shows that the individual's work group peers may be just as salient a force in affecting the individual's performance. Thus, this study provided an opportunity to examine simultaneously both supervisory and peer interactions.

These communication factors were operationalized in Section IV of the Communication Assessment Package - Part A (see Appendix A for reprints of the data collection instruments). The first 38 items (in Section A) tap the individual's communication with his or her immediate supervisor. The items were chosen based upon

their factor loadings in the Huseman et al. (1980) study. Some items (e.g., Items 7 and 9 on the present questionnaire) were rewritten to better reflect the maintenance specialist's work context. Each of the seven message types is represented among the 38 items:

<u>Message Type</u>	<u>Items</u>
Direction	1-5
Information	6-10
Participation	11-16
Feedback	17-21
Negative Expression	22-26
Rationale	27-32
Positive Expression	33-38

Section B contains 40 items assessing communication with work group peers. Again, the seven message types are represented:

<u>Message Type</u>	<u>Items</u>
Direction	1-3
Information	4-9
Participation	10-15
Feedback	16-21
Negative Expression	22-27
Rationale	28-33
Positive Expression	34-40

Finally, Section C contains the written communication items, as well as a single question (Item 12) designed to tap the use of

test equipment as a feedback device. The written communication message types and their corresponding items are:

<u>Message Type</u>	<u>Items</u>
Direction	1-6
Rationale	7-8,11
Information	9-10

It is important to note that data for all three variables (communication, productivity, and moderators) were gathered at both the job and task levels (see McCormick, 1976). For example, within a specific DAFSC, a maintenance specialist might have a job of "bench checker." Within that job, there are many different tasks he or she might perform: bench check signal data processor, bench check radar receiver, bench check inertial measurement units and so on. The job, then, is a molecular work unit, reflecting the entire array of responsibilities an individual might have. That job is composed of more atomistic tasks.

Thus, Part A of the Communication Assessment Package (in Appendix A) was designed to tap the three major study variables in terms of the individual's job. Part B (in Appendix B) gathered data on the variables at the level of the task the individual performed most frequently while on the job.

Inspection of Section III of Part B will show that four of the message types were included in the 20-item Communication with Supervisor section:

<u>Message Type</u>	<u>Items</u>
Direction	1-5
Participation	6-11
Feedback	12-15
Rationale	16-20

Positive Expression, Negative Expression, and Information were not included in the task level analysis since they were deemed more relevant to the job than task level.

The 19-item Communication with Fellow Workers section taps the same four message types:

<u>Message Type</u>	<u>Items</u>
Direction	1-3
Participation	4-8
Feedback	9-14
Rationale	15-19

Finally, written communication together with the test equipment feedback item, was included in Section C:

<u>Message Type</u>	<u>Items</u>
Direction	1-6
Rationale	7-8

In summary, three communication interaction patterns (communication with supervisor, communication with work group peers, and written communication) were operationalized at two levels: the job (Appendix A, Section IV) and the task (Appendix B, Section

III). A total of 90 items were constructed to assess communication at the job level; 48 items for communication at the task level.

2. Productivity. The Communication-Productivity Model presented earlier posits that productivity can include a number of performance criteria, among them quantity and quality of work, absenteeism and tardiness. In terms of productivity criteria chosen for this study, our interviews during Phase I showed: (1) currently used "hard" measures of performance (e.g., time logs) lacked scientific rigor; (2) maintenance supervisors were most concerned about the quantity and quality of their subordinates' work; and (3) the diversity of jobs and tasks (e.g., repair versus service) performed by maintenance specialists would probably preclude the use of either hard or soft measures based upon specific job or task analyses, in terms of both the time required to construct such measures and the consequent incomparability of results across jobs or tasks.

In the absence of hard performance measures to evaluate a maintenance specialist's effort, rating procedures were chosen as the best approach to assessing performance. First, criteria for an acceptable rating procedure were chosen. The procedure would need to be:

1. Applicable to the diversity of maintenance specialists to be surveyed in the study.
2. Reliable.
3. Relevant to the needs of the organization cooperating in the study.
4. Multidimensional (rather than unidimensional), as in a single, global rating of performance).

5. A useful, nontrivial way of describing performance.
6. Free from common errors in rating procedures (e.g., leniency, severity, distribution errors).

These criteria were adapted from various sources, including Guion (1965), Lawler (1967), and Smith (1976).

Performance was assessed at the individual and work group levels for both the job and task. At the individual level, both supervisory and self-ratings of performance were chosen. Although peer ratings were considered, our Phase I interview respondents suggested that in many cases peers would have even less opportunity to observe an individual's performance than would an immediate supervisor. And, despite the obvious potential for bias in self-ratings (Smith, 1976), we decided to gather both sets of ratings and then compare them. At the work group level, only self-ratings were used.

Operationalizations of these performance ratings are contained in: (1) Appendix A (Section III) for work group and individual self-rated job performance, (2) Appendix B (Section II) for work group and individual self-rated task performance, and (3) Appendix C for supervisory ratings of both individual job and task performance. The rating scales first require performance to be rated in comparison to other individuals or work groups. Clearly, paired comparisons would have elicited better comparative data. However, the number of paired items needed would have been prohibitive. Second, the items focus attention on both quantity and quality of performance, and in each case an overall estimate of performance is requested.

In summary, productivity was operationalized at both the job and task levels. Self and supervisory ratings were used to assess individual job and task performance. Self-ratings only were used to assess work group performance.

3. Moderator Variables. The Communication-Productivity Model posits that variables (moderators) within the individual, work group, and organization affect the relationship between communication and productivity. Obviously, the list of potential moderators is extensive. During the Phase I interviews, respondents indicated that maintenance specialists who might be involved in the study performed a wide range of tasks, varying from simple, repetitive activities such as fueling aircraft or ordering parts to more complex demanding tasks such as troubleshooting complicated electrical systems. Clearly, a significant mixture of jobs and tasks was present in the potential sample.

Conceptually it seems logical that work characteristics would be the most central moderator variables. That is work dimensions would be most crucial to the relationship between communication and performance. Therefore seven specific job and task characteristics were chosen as moderator variables in this study. Five of these characteristics were selected from previous research; the remaining two, from the results of Phase I interviews.

One of the most widely used measures of job and task characteristics is Hackman and Oldham's (1975) Job Diagnostic Survey (JDS). Originally developed to assess the characteristics of jobs before and after they were redesigned, (Hackman and Oldham, 1974), the instrument taps and differentiates among five specific job or

task characteristics:

1. Skill variety: The degree to which a job requires a variety of different activities in carrying out work, which involve the use of a number of different skills and talents of the employee.
2. Task Identity: The degree to which the job requires completion of a "whole" and identifiable piece of work (i.e., doing a job from beginning to end with a visible outcome).
3. Task Significance: The degree to which the job has a substantial impact on the lives or work of other people -- whether in the immediate organization or the external environment.
4. Autonomy. The degree to which the job provides substantial freedom, independence, and discretion of the employee in scheduling the work and in determining the procedures to be used in carrying it out.
5. Job Feedback. The degree to which carrying out the work activities required by the job results in the employee obtaining direct and clear information about the effectiveness of his or her performance (Hackman and Oldham, 1974, p.5).

Two other job and task characteristic moderators were developed from the Phase I interview results: job press and job interdependence. Respondents indicated that jobs and tasks performed by maintenance specialists would also vary significantly in terms of the amount of work load and cooperation with other people required. Thus, moderator variables six and seven were:

6. Job Press: The degree to which the job work load or pace creates pressure on the employee to "keep up" or even "catch up" while on the job.
7. Job Interdependence. The degree to which the job requires the employee to work and cooperate with other people in completing it.

These seven moderator variables were operationalized at both the job and task levels. Section II of the questionnaire in Appendix A contains the ten items (two per job characteristic)

adapted from Hackman and Oldham's JDS, as well as the four especially developed items. The items assessing the task characteristics are contained in Section I of the questionnaire in Appendix B.

In summary, then, this study investigated the relationships among three sets of variables, communication, productivity, and moderator, at both the job and task levels. Figure 3 contains the specific variables examined at the job level; Figure 4, the same variables examined at the task level.

Phase III -- Testing the Conceptual Framework

The purpose of this Phase of the study was to test the conceptual framework (Communication Matrix and Communication-Productivity Model) by gathering and analyzing data concerning the three sets of variables operationalized in Phase II.

Sample

Subjects for the study were 461 maintenance specialists at three Air Force bases: Eglin AFB, Florida; Hurlburt Field, Florida; and Moody AFB, Georgia. Ss Grade ranged from E1 to E6, although most (N=203) were E3. The average subject had been in his or her present job for 23½ months and had received four months of training for his or her DAFSC. Nineteen separate DAFSCs were represented in the sample. Subjects were drawn from three maintenance squadrons at each base: Aircraft Generation Squadron (AGS), Component Repair Squadron (CRS), and Electrical Maintenance Squadron (EMS). Table 1 shows the sample breakdown by base and squadron.

<u>Communication</u>	<u>Moderators</u>	<u>Productivity</u>
A. <u>With Supervisor</u>	-Skill Variety	-Quantity of Work
-Direction	-Task Identity	-Quality of Work
-Information	-Task Significance	-Overall Job Performance
-Rationale	-Autonomy	
-Participation	-Job Feedback	
-Feedback	-Job Press	
-Positive Expression	-Job Interdependence	
-Negative Expression		
B. <u>With Peers</u>		
-Direction		
-Information		
-Rationale		
-Participation		
-Feedback		
-Positive Expression		
-Negative Expression		
C. <u>Written</u>		
-Direction		
-Information		
-Rationale		

Figure 3. Variables Investigated at the Job Level

<u>Communication</u>	<u>Moderators</u>	<u>Productivity</u>
A. <u>With Supervisor</u>	-Skill Variety	-Quantity of Work
-Direction	-Task Identity	-Quality of Work
-Rationale	-Task Significance	-Overall Job Performance
-Participation	-Autonomy	
-Feedback	-Job Feedback	
	-Job Press	
B. <u>With Peers</u>	-Job Interdependence	
-Direction		
-Rationale		
-Participation		
-Feedback		
C. <u>Written</u>		
-Direction		
-Rationale		

Figure 4. Variables Investigated at the Task Level

TABLE 1
Breakdown of Sample by Base and Squadron (N=461)

<u>Squadron</u>	<u>Base</u>		
	<u>Eglin AFB</u>	<u>Hurlburt Field</u>	<u>Moody AFB</u>
AGS	67	70	35
CRS	46	44	59
EMS	<u>53</u>	<u>28</u>	<u>59</u>
Total	166	142	153

Procedures

1. Subject Selection. From a list of maintenance supervisors at each base, 107 supervisors were randomly selected (Eglin=39; Hurlburt=29; Moody=39). Through liaisons at each base, these supervisors were contacted and asked to list the names of the maintenance specialists whom they supervised. They also listed the specific task they thought each specialist performed most frequently while on the job. Each specialist listed was included in the sample pool. The actual N used in the study was less than the sample pool since a number of those listed were unavailable to complete survey questionnaires because of leave or TDY. The average number of sample subjects reporting to each supervisor was therefore 4.3.

2. The Communication Assessment Package, Part A (job level) and Part B (task level) was administered during group meetings of respondents during the three work shifts at each base. The average time taken to complete both questionnaires was approximately thirty minutes. With the Part B questionnaire, subjects were

given a list of tasks broken down by Base and DAFSC (see Appendix D). These tasks were duplicated from the lists provided earlier by supervisors. Subjects were asked to choose the task within their DAFSC which they performed most frequently while on the job, write the task name at the beginning of Part B, and answer all Part B questions with reference to that task. Subjects identified and responded to questions about 216 most frequently performed tasks.

3. Completed questionnaires were sorted according to supervisor. Then the name of each subject, together with the task he or she most frequently performed, was entered on the supervisory performance rating forms (Appendix C). Supervisors were asked to rate the performance of each subject they supervised on both the job in general and the task identified by the subject.

DATA RESULTS AND DISCUSSION

It must be remembered that this project was an exploratory investigation to perform initial testing of the Communication-Productivity Model. One major purpose of the data analyses therefore was to evaluate the development of data collection instruments and their usefulness for more extensive work. The remaining analyses were to perform limited testing of the adequacy of the model in determining the relationship between communication and work performance. The information in this section will be presented in accordance with these two objectives. The first part will be devoted to instrument development with the remainder focused on results of the testing of the model.

Instrument Development

Performance Measures. As has been stated previously, discussions with both Air Force research personnel and base officers during the initial phase of the project were to a large extent focused on the difficulties of obtaining adequate work performance data. Several psychometric difficulties for the testing of the Communication-Productivity Model were identified. This required "subjective" measures, based on individual opinion, to be developed. As described previously these measures were 3-item scales that asked for ratings of quantity and quality of both overall job performance and also single task performance. Supervisory ratings were obtained as well as self-ratings by airmen for their own performance and the performance of their work group.

Statistical analyses of these scales of work performance were then undertaken to evaluate their adequacy. Means and standard deviations were computed for each work performance scale to give partial indication as to the possibility of rating errors caused by rating leniency or restriction in the range of scale points. These results are presented in TABLE 2. For ease of understanding, all data have been transformed into a 1-5 scale with one being a low rating and five being a high rating. The data are similar for both job performance and task performance scales. The supervisory ratings and the worker self-ratings both demonstrate acceptable psychometric characteristics in that means are near the mid-point of the 1-5 scale and standard deviations indicate dispersion in the use of scale points, with the standard deviations of supervisory ratings being uniformly greater than

the self-ratings. The ratings of group performance were less desirable than the other scales mainly because of elevated scale means which were approximately one full point higher than either the supervisory or self-individual ratings.

Intercorrelations were then computed among the nine performance scales for both the job and task performance data. TABLE 3 presents these intercorrelations. Again a similar pattern evolved among the various sets of scales. Intercorrelations between quality and quantity were high within all performance sets (supervisor, self-individual, self-group) for both job and task performance, with the highest correlations occurring for supervisory ratings. Very high intercorrelations (.86 to .94) were also determined between overall performance and both quantity and quality for all three sets of rankings. This was expected in that the overall performance scale was a composite of the quantity and quality scales. It is interesting to note that intercorrelations between supervisor and self-individual ratings for the same performance scales were not high (.23 to .31) indicating little agreement among specialists and their immediate supervisors in perception of work performance.

Cronbach's alpha was also computed for each performance scale to obtain reliability estimates for these measures (see TABLE 4). Results indicate higher reliability for supervisor's ratings than for self-ratings, especially for the quantity scales. Also reliability of overall performance was superior to that of quantity or quality scales, partially due to the increased number of items comprising the overall scale.

TABLE 2
Work Performance Scales Means and Standard Deviations

Job Performance Scales

<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Quantity Rating - Supervisor	2.66	.71
Quality Rating - Supervisor	2.50	.72
Overall Performance - Supervisor	2.58	.67
Quantity-Self Rating	2.67	.56
Quality-Self Rating	2.44	.54
Overall Performance-Self Rating	2.56	.47
Group Quantity-Self Rating	3.62	.68
Group Quality-Self Rating	3.64	.73
Group Overall Performance-Self Rating	3.63	.64

Task Performance Scales

<u>Scale</u>	<u>Mean</u>	<u>Standard Deviation</u>
Quantity Rating - Supervisor	2.64	.71
Quality Rating - Supervisor	2.38	.71
Overall Performance Rating - Supervisor	2.51	.66
Quantity-Self Rating	2.66	.53
Quality-Self Rating	2.43	.53
Overall Performance-Self Rating	2.54	.46
Group Quantity-Self Rating	3.76	.66
Group Quality-Self Rating	3.70	.68
Group Overall Performance-Self Rating	3.73	.62

TABLE 3

Intercorrelations Among Performance Scales

	<u>Job Performance</u>								
	Quantity Superv.	Quality Superv.	Overall Superv.	Quantity Self	Quality Self	Overall Self	Group Quantity	Group Qual.	Group Overall
Quantity-Sup.	1.00	.77	.94	.26					
Quality-Sup.		1.00	.94		.24	.31			
Overall-Sup.			1.00			.87			
Quantity-Self				1.00	.51	.86			
Quality-Self					1.00	1.00			
Overall-Self						1.00			
Group Quantity							1.00	.63	.91
Group Quality								1.00	.90
Group Overall									1.00

	<u>Task Performance</u>								
	Quantity Superv.	Quality Superv.	Overall Superv.	Quantity Self	Quality Self	Overall Self	Group Quantity	Group Qual.	Group Overall
Quantity-Sup.	1.00	.75	.94	.23					
Quality-Sup.		1.00	.93		.23	.28			
Overall-Sup.			1.00			.87			
Quantity-Self				1.00	.53	.87			
Quality-Self					1.00	.87			
Overall-Self						1.00			
Group Quantity							1.00	.74	.93
Group Quality								1.00	.94
Group Overall									1.00

TABLE 4
Reliability Estimates for Performance Scales

Job Performance	
<u>Scale</u>	<u>Cronbach's Alpha</u>
Quantity-Supervisor	.75
Quality-Supervisor	.87
Overall-Supervisor	.89
Quantity-Self	.41
Quality-Self	.69
Overall-Self	.70
Group Quantity	.58
Group Quality	.41
Group Overall	.73
Task Performance	
<u>Scale</u>	<u>Cronbach's Alpha</u>
Quantity-Supervisor	.76
Quality-Supervisor	.88
Overall-Supervisor	.89
Quantity-Self	.41
Quality-Self	.72
Overall-Self	.72
Group Quantity	.64
Group Quality	.75
Group Overall	.83

On the basis of these analyses it was determined that for the remaining analyses that would preliminarily test the Communication-Productivity Model, the supervisory ratings of overall performance should be utilized. The superior reliability of the supervisory rating in comparison to self-ratings was the most important factor in this decision. Also of significance was the high intercorrelations between quantity and quality. Smith (1976) discusses this as being a precondition for combining these into a single measure. Finally the means and standard deviations of these overall measures were also favorable, showing an absence of rater bias.

Communication Factors. As discussed previously, the communication questionnaire used in this research was developed during prior work. It was based first on content analyses of supervisor-subordinate dialogues. This analysis led to the writing of questionnaire items that were administered to a cross-section of industrial workers. Factor analysis of the questionnaire items yielded a seven communication factor solution. It was the questionnaire based on this factor analysis that was used in this research.

Analyses in this project were therefore designed to study the stability of the seven communication factors when used to describe communication within Air Force maintenance operations. Factor analyses were performed of airmen responses to the communication questionnaires to determine if identical or nearly identical communication factors could be identified in comparable instances. Separate factor analyses were conducted on the following communication questionnaires:

1. Supervisor-worker job communication
2. Peer work group job communication
3. Written job communication
4. Supervisor-worker task communication
5. Peer work group task communication
6. Written task communication

The Supervisor-worker job communication section and the Peer work group job communication sections were nearly identical with the former containing 38 items and the latter 40 items. Both sections inquired essentially about the same communication content with only the communication source being different. Similarly the Supervisor-worker task communication section and the Peer work group task communication section were nearly identical with the former containing 20 items and the latter 19 items. The Written job communication section and the Written task communication section were also very similar with 11 and 8 items respectively. The Written task communication section excluded organizational communication items.

After a factor analysis was run on each section, comparisons were made between the factor structure of each pair of similar sections. TABLE 5 contains the seven-factor solutions from the two non-written job communication sections; TABLE 6 contains the four-factor solutions of the two non-written task communication sections; TABLE 7 contains the factor solutions from the written communication sections. In each analysis a maximum likelihood factor analysis was performed with a procrustean rotation of the VARIMAX solution. This is an oblique rotation.

TABLE 5
Supervisor-Subordinate Job Communication Factor Structure Matrix

Item	Factor						
	Positive Expression	Rationale	Negative Expression	Participation	Feedback	Direction	Information
1. Gives specific performance objectives.	.32	.40	.13	.23	.36	.42	-.19
2. Schedules work.	.07	.20	-.09	.04	.19	.63	-.13
3. Sets deadlines.	.00	.11	-.19	.08	.11	.57	-.05
4. Tells what materials/equipment to use.	.10	.21	-.07	.05	.21	.73	-.08
5. Tells what steps to follow.	.10	.19	-.15	.05	.19	.69	-.13
6. Informs about rules and policies	.16	.43	-.00	.18	.30	.30	-.30
7. Informs about benefits.	.35	.44	.15	.10	.46	.14	-.47
8. Informs about group plans.	.39	.51	.29	.24	.46	.16	-.53
9. Informs about organization plans.	.27	.46	.20	.18	.38	.09	-.62
10. Informs about other groups.	.29	.42	.09	.21	.46	.24	-.24
11. Question misunderstood instructions.	.13	.17	.03	.58	.11	.06	-.01
12. Make suggestions.	.23	.16	-.03	.67	.13	.10	-.16
13. Question wrong instructions.	1.06	.12	-.04	.60	.04	-.02	-.03
14. Tell my problems.	.34	.35	.01	.59	.26	.18	-.18
15. Asked for opinions.	.23	.43	.31	.40	.53	.03	-.28
16. Tell group problems.	.58	.27	.01	.56	.30	.08	-.25
17. Tells me if good job.	.50	.57	.38	.18	.85	.21	-.30
18. Discusses how to get promotion.	.51	.58	.23	.13	.71	.21	-.42
19. Tells me if working well with peers.	.32	.43	-.06	.20	.82	.26	-.34
20. Tells me about my job attitude	.58	.59	.36	.26	.61	.29	-.29
21. Expresses appreciation for good work.	.27	.22	.80	-.05	.71	.22	-.33
22. Critical of my work.	.23	.29	.74	.03	.27	-1.6	-.05
23. Ridicules me.	.53	.53	.38	.17	.59	-.06	-.06
24. Apologizes for mistakes.	.15	.14	.39	-.05	.05	-.19	-.18
25. Critical of me.	.50	.51	.50	.13	.43	-.01	-.08
26. Asks me to do things.	.48	.76	.34	.49	.49	-.01	-.08
27. Tells why job is to be done.	.46	.71	.25	.24	.63	.23	-.35
28. Tells reasons for performance.	.46	.83	.24	.19	.56	.28	-.40
29. Tell reasons for rule/policies.	.45	.82	.24	.22	.54	.29	-.46
30. Tell why standards change.	.44	.77	.32	.29	.51	.17	-.31
31. Tells why assignment changes.	.44	.73	.30	.28	.50	.15	-.23
32. Tells reasons for schedules.	.76	.52	.32	.25	.53	.11	-.02
33. Strikes casual conversation.	.84	.54	.34	.25	.54	.14	-.03
34. Jokes good naturedly.	.84	.44	.28	.28	.47	.06	-.13
35. Talks about outside interests.	.79	.37	.21	.22	.48	.14	-.49
36. Asks about my family.	.88	.46	.25	.20	.49	.14	-.40
37. Asks about my outside interests.	.71	.47	.30	.24	.56	.14	-.39
38. Expresses sympathy.							

TABLE 5 (continued)
Peer Job Communication Factor Structure Matrix

Item	Factor					Direction	Rationale
	Information	Positive Expression	Participation	Negative Expression	Feedback		
1. Check before performing job.	.12	.01	.04	.09	.12	-.53	-.10
2. Check about material/equipment.	-.00	-.02	.03	-.07	-.01	-.73	.04
3. Tell me steps to follow.	-.06	.02	.07	-.13	.01	-.77	.00
4. Inform about rules and policies.	-.24	.01	.01	-.01	.04	-.50	-.12
5. Discuss problems of job.	-.09	-.09	.52	.03	-.01	-.12	.03
6. Inform about benefits.	-.78	-.01	.04	-.03	-.03	-.05	.06
7. Inform about group plans.	-.76	-.05	.05	.03	-.05	-.05	-.05
8. Inform about organization plans.	-.75	.05	.01	.04	-.10	.01	-.13
9. Inform about other groups.	-.50	-.02	.16	-.05	.03	.08	-.15
10. Make suggestions.	.00	.06	.74	-.10	-.09	-.06	-.01
11. Asked for suggestions.	-.10	.05	.79	.10	.08	.16	.05
12. Tell my problems.	-.15	-.06	.28	-.19	.05	-.18	-.13
13. Asked for opinions.	.04	-.08	.71	.06	.12	.08	.04
14. Tell group problems.	-.03	-.03	.57	-.14	.01	-.00	-.06
15. Question wrong actions.	.13	.02	.52	-.04	.05	-.08	-.03
16. Tell me if good job.	-.14	.09	.08	.10	.70	.01	-.04
17. Discuss how to get promoted.	-.61	.01	.19	.02	.30	.03	-.01
18. Tell me if working well with peers.	-.03	.02	.04	.05	.74	-.07	.07
19. Tell me how I compare.	.05	.01	.02	-.27	.67	.04	-.09
20. Tell me about my job attitude.	-.07	-.07	.03	.33	.62	-.02	-.02
21. Express appreciation for good work.	.03	-.01	.03	.02	.84	-.01	-.02
22. Critical of my work.	-.03	.04	-.05	.79	-.05	.10	.02
23. Ridicule me.	.01	-.07	.00	.71	.05	-.04	-.04
24. Admit to their mistakes.	-.03	-.10	.04	.26	.37	-.11	-.00
25. Apologize for mistakes.	.02	.22	.02	.24	.41	-.08	-.02
26. Critical of me.	.00	-.03	-.05	.42	-.08	.03	-.01
27. Ask me to do things.	.02	.18	.06	.26	.17	-.07	-.09
28. Tell why job is to be done.	-.09	-.01	.04	.09	.12	-.07	.41
29. Tell reasons for rules/policies.	-.21	-.02	-.04	.05	-.02	-.10	-.10
30. Tell reasons for performance.	.02	-.10	.02	-.12	.31	.11	.55
31. Tell why standards change.	-.03	.05	-.01	.02	.06	.04	.85
32. Tell why assignments change.	-.01	-.01	.01	.03	-.06	-.04	-.86
33. Tell reasons for schedules.	-.08	.02	-.02	.01	-.02	-.06	-.73
34. Strikes casual conversation.	.11	-.70	.07	.04	-.15	-.04	-.04
35. Greet me at work.	.04	-.61	.04	.17	.07	-.08	.01
36. Joke good naturedly.	.11	-.79	.03	.13	-.10	-.10	-.03
37. Talk about outside interests.	.02	-.88	.04	.00	-.03	.03	-.00
38. Ask about my family.	-.18	-.71	-.03	-.13	.07	.09	.04
39. Ask about my outside interests.	-.05	-.87	-.02	-.13	.03	.08	.02
40. Express sympathy.	-.11	-.69	-.14	-.04	.16	.04	.02

TABLE 6

Supervisor-Subordinate Task Communication Factor Structure Matrix

Item	Factor			
	Feedback	Rationale	Participation	Direction
1. Gives specific performance objectives.	.52	.47	.27	.67
2. Schedules my task.	.31	.26	.14	.64
3. Sets the deadline I have to meet.	.22	.24	.20	.63
4. Tells me materials/equipment to use.	.32	.38	.17	.80
5. Tells me steps to follow.	.37	.40	.12	.75
6. Question supervisor's instructions when I don't understand.	.20	.23	.66	.18
7. Make suggestions to supervisor.	.26	.29	.75	.20
8. Question supervisor's instructions when I think they are wrong.	.21	.17	.78	.06
9. Tell supervisor my work problems.	.33	.39	.59	.28
10. Supervisor asks my opinions about task.	.58	.44	.43	.30
11. Tell supervisor about problems of work group.	.43	.38	.52	.28
12. Lets me know when I have done a good job.	.91	.55	.25	.39
13. Lets me know when I am working well with others.	.88	.59	.29	.42
14. Tells me what he/she thinks of my attitude.	.69	.54	.37	.44
15. Expresses appreciation for work well done.	.88	.57	.29	.37
16. Tells me why task is to be done.	.59	.73	.28	.43
17. Tells me reasons for his/her view of my performance.	.76	.74	.38	.50
18. Tells me why changes are made in quality standards.	.63	.86	.31	.42
19. Tells me why changes are made in work assignments.	.56	.90	.30	.38
20. Tells me reasons for work schedules.	.56	.89	.37	.39

TABLE 6 (Continued)

Peer Task Communication Factor Structure Matrix

Item	Factor		
	Rationale	Feedback	Direction Participation
1. Check with fellow workers before task.	.38	.32	-.63
2. Check with fellow workers about materials/equipment.	.41	.30	-.89
3. Fellow workers tell me steps to follow.	.49	.40	.77
4. Make suggestions to fellow workers.	.25	.37	.50
5. Fellow workers ask me for suggestions.	.27	.43	.34
6. Tell fellow workers about work problems.	.51	.51	.47
7. Fellow workers ask my opinion.	.31	.45	.27
8. Tell fellow workers about problems in our work group.	.38	.49	.35
9. Tell fellow workers when I think they are wrong.	.26	.36	.20
10. Fellow workers let me know when I do a good job.	.52	.87	.36
11. Fellow workers let me know when I am not working well with them.	.38	.70	.28
12. Fellow workers let me know when I work well with them.	.50	.69	.36
13. Fellow workers let me know how I compare.	.47	.89	.34
14. Fellow workers express appreciation.	.50	.86	.36
15. Fellow workers tell me why task is to be done.	.78	.59	.53
16. Fellow workers tell me reasons for their view of my performance.	.75	.70	.47
17. Fellow workers tell me why changes in quality standards.	.84	.56	.44
18. Fellow workers tell me why changes in work assignments.	.92	.47	.44
19. Fellow workers give me reasons for work schedules.	.86	.45	.44
			.25
			.38
			.34
			.80
			.87
			.52
			.80
			.65
			.57
			.49
			.42
			.32
			.50
			.46
			.31
			.43
			.31
			.33
			.33

TABLE 7

Written Communication - Job Factor Structure Matrix

Item	Factor		
	Policies and Regulations	Job Specifications	Job Information
1. Use manuals for performance objectives.	.15	.65	.00
2. Check manuals before performing work.	-.04	.80	.01
3. Check manuals for quality standards.	.02	.50	.33
4. Use manuals for materials/equipment.	-.02	.78	.10
5. Use manuals for specific steps.	-.03	.91	-.05
6. Use manuals to schedule work.	.07	.17	.42
7. Use manuals to understand why job is done.	.01	.10	.71
8. Use manuals to understand change in standards.	.06	-.06	.89
9. Use manuals to find rules and policies.	.65	.12	.16
10. Use manuals to find out about benefits.	.86	-.02	-.07
11. Use manuals for reasons of rules and policies.	.81	-.03	.10

Written Communication - Task Factor Structure Matrix

Item	Factor		
	Task Specifications	Task Information	Task Information
1. Use manuals for performance objectives	.74	.62	.62
2. Use manuals to schedule task.	.53	.72	.72
3. Use manuals before performing task.	.89	.57	.57
4. Use manuals for quality standards.	.74	.69	.69
5. Use manuals for material/equipment.	.85	.60	.60
6. Use manuals for specific steps.	.92	.55	.55
7. Use manuals to understand why job is done.	.59	.82	.82
8. Use manuals to understand changes in standards.	.50	.85	.85

Comparison of the factor solutions indicated similar factor structure for the pairs of questionnaires. For determination of the factor structures, items were grouped according to their highest factor loading on the seven factors. An item was omitted if it did not have one dominant factor loading but rather two or three high but very similar loadings. Factors were then named on the basis of the grouped items. Because of the oblique rotation several items had .50-.80 loadings on two or more scales. These were retained unless the magnitude of the loadings were very close to one another. For the job communication questionnaires the following seven factors were identified:

- (a) direction
- (b) general information
- (c) participation
- (d) feedback
- (e) rationale
- (f) positive expression
- (g) negative expression

These were essentially the same seven factors identified in research previous to this project and discussed in the section "Research Instruments and Operations" of this report.

Similarly the factor analyses for the two task communication questionnaires yielded the following four factors in each case:

- (a) rationale
- (b) feedback
- (c) direction
- (d) participation

The factor analyses for the two written communication questionnaires yielded slightly different results. The Written Communication-job section yielded three factors: job specifications, job information, and policies and regulations. The Written Communication-task section yielded two factors: task specifications and task information. The reason for this difference is that the three items comprising the policy and regulation factor on the job questionnaire were only appropriate when addressed to job communication and were therefore not included in the task questionnaire. The other two factors are identical for the two questionnaires.

As a result of these comparisons it was concluded that the communication questionnaires did yield stable communication factors in describing both job and task communication.

To conduct further analyses, scale scores were therefore computed for each respondent on each communication factor of the questionnaires. Only items that were grouped to name a factor were used to determine scale scores. Each item was assumed to have an equal weight in the scale, and an individual's score on an item was therefore a function of his/her response to the item. In general a response of "always" to an item yielded an item score of "5"; a response of "never" yielded an item score of "1". Scale scores were determined by summing the respondent's individual item scores for the appropriate items.

After this was completed for each respondent, communication scale means and standard deviations were then determined for each scale (TABLES 8-10). This was done to investigate the response

TABLE 8

Job Communication Scale Means and Standard Deviations

<u>Supervisor</u>	<u>Mean</u>	<u>S.D.</u>
Positive Expression	3.16	.97
Rationale	2.98	.94
Negative Expression	4.11	.75
Participation	3.43	.67
Feedback	2.73	.98
Direction	2.78	.80
Information	2.49	.88
<u>Peer</u>		
Positive Expression	3.91	.75
Rationale	2.55	.81
Negative Expression	3.99	.75
Participation	3.18	.65
Feedback	2.61	.79
Direction	2.87	.79
Information	2.22	.80

TABLE 9
Task Communication Scale Means and Standard Deviations

<u>Supervisor</u>	<u>Mean</u>	<u>S.D.</u>
Feedback	2.84	.98
Rationale	.277	.93
Participation	3.47	.75
Direction	2.68	.84
<u>Peer</u>		
Feedback	3.10	.71
Rationale	2.74	.86
Participation	2.37	.85
Direction	2.75	.87

TABLE 10
Written Communication Scale Means and Standard Deviations

<u>Job</u>	<u>Mean</u>	<u>S.D.</u>
Job Specifications	3.87	.89
Job Information	2.86	1.11
Policies and Regulations	2.83	1.00

<u>Task</u>		
Task Specifications	3.78	1.03
Task Information	2.91	1.08

characteristics of the scales. As was done for the performance scales, the metric of all scale scores was transformed to a one to five scale, with one being a low score and five being a high score. Inspection of these data indicates that most of the scales are seemingly free from rating problems in that most means are near the midpoint of the scale and standard deviations are adequately large (.80+). For the job communication scales the Supervisor Negative Expression scale and both the Peer Positive Expression scale and the Peer Negative Expression scale all have rather high means (4.11, 3.91, 3.99 respectively) indicating a skewed response distribution. For the written communication scales both the Job Specifications scale and the Task Specifications scale also have slightly higher means (3.87 and 3.78 respectively). In none of these scales however was it thought that the limitation was severe enough to disqualify the scale from further analysis.

Moderator Variables, In this study moderator variables were scales measuring job or task characteristics. It was hypothesized that these characteristics affect the relationship between communication and work performance. Before this hypothesis could be tested, it was necessary to demonstrate that meaningful job/task characteristics for Air Force maintenance activities could be identified and measured.

As discussed in the section "Research Steps and Procedures", identification of these moderator variables was based primarily on the extensive, prior research on work characteristics. Specifically the variables comprising the Job Diagnostic Survey

(JDS) (Hackman and Oldham, 1974, were chosen: (1) because of Hackman and Oldham's developmental work measuring reliability and intercorrelations among the variable scales, and (2) because these JDS variables had been used extensively in other research investigating the relationship between work characteristics and performance levels.

The scales based on the JDS were: skill variety, identity, feedback, significance, and autonomy. Based on Phase I conversations, scales measuring work interdependence and work pressure were also developed. As was the case in investigating the adequacy of the other scales used in this project, the first analysis on these scales was to determine the individual scale means and standard deviations. These data are presented in TABLE 11 for both job and task dimensions. All scales were transferred to a 1-5 metric with a score of one being low and a score of five being high. For the Job Moderator Scales, the mean scores for interdependence (3.95) and significance (4.28) are high and the mean score for pressure (2.04) is low indicating possible restriction in ratings. Frequency distributions of individual scores for these three scales, as shown in TABLE 12, also are indicative of this problem. For interdependence only 22% of the jobs are rated at or below the mid-point of the five item scale; for significance the number is less than 15%. For pressure less than 10% of the jobs are rated as being above the mid-point of the five point scale.

The scale means and standard deviations of the remaining job moderator scales indicate adequate score dispersions for further statistical analyses.

TABLE 11
Moderator Scale Means and Standard Deviations

<u>Job Moderators</u>	<u>Mean</u>	<u>S.D.</u>
Skill Variety	3.17	1.19
Interdependence	3.95	.92
Identity	3.65	1.13
Feedback	3.66	1.02
Pressure	2.04	.96
Significance	4.28	.86
Autonomy	3.23	1.08

<u>Task Moderators</u>	<u>Mean</u>	<u>S.D.</u>
Skill Variety	2.79	1.24
Interdependence	3.27	.76
Identity	3.33	1.12
Feedback	3.48	1.06
Pressure	1.87	1.02
Significance	4.08	.93
Autonomy	3.32	1.06

TABLE 12
Frequency Distributions of Selected Job Moderator Scales

<u>Scale Point</u>	<u>Cumulative Percent</u>		
	<u>Interdependence</u>	<u>Significance</u>	<u>Pressure</u>
1	1.09	.44	24.18
2	5.01	3.06	65.14
3	22.22	14.63	90.20
4	55.12	38.21	96.51
5	100.00	100.00	100.00

The scale mean scores for the task moderator scales indicated only two possible rating deficiencies. Significance had a high mean (4.08) and pressure had a low mean (1.87). Frequency distributions of individual scores for these two scales (TABLE 13) verified this as 79% of the tasks were rated above the scale mid-point for significance and 88% of the tasks were rated at or below the scale mid-point for pressure.

Overall these results indicated some limitations concerning further statistical analyses using these scale scores. Lack of dispersion (variance) can be a major statistical problem especially in regression analysis as is used in this study. This seems especially true for the moderator pressure at both the job and task level. Responses indicate that a vast majority of work activities are not perceived as having pressure associated with them.

Analyses of intercorrelation matrices among the seven job moderator scales and the seven task moderator scales are shown in TABLES 14 and 15, respectively. Both matrices indicate a large number of significant correlations among the moderator scales. This is especially true for feedback, significance and autonomy scales at the job level. These results of course also indicate limitation in multiple regression analyses using these scales as a group.

Preliminary Testing of Communication - Productivity Model

The Communication-Productivity Model holds that the frequency of specific communication messages is related to individual work performance. The nature or make-up of specific communication depends on the characteristics of the work activity. For example,

TABLE 13
Frequency Distributions of Selected Task Moderator Scales

<u>Scale Point</u>	Cumulative Percent	
	<u>Significance</u>	<u>Pressure</u>
1	.45	43.92
2	4.06	82.67
3	21.89	88.51
4	48.53	98.20
5	100.00	100.00

TABLE 14
Intercorrelations Among Job Moderator Scales

	Skill Variety	Interdependence	Identity	Feedback	Pressure	Significance	Autonomy
Skill Variety	1.00	.06	.10*	.44**	.02	.37**	.28**
Interdependence		1.00	-.05	.13**	.03	.26**	.06
Identity			1.00	.21**	-.25**	.19**	.29**
Feedback				1.00	-.22**	.39**	.46**
Pressure					1.00	-.13**	-.24**
Significance						1.00	.17**
Autonomy							1.00

* = p < .05

** = p < .01

TABLE 15
Intercorrelations Among Task Moderator Scales

	Skill Variety	Interdependence	Identity	Feedback	Pressure	Significance	Autonomy
Skill Variety	1.00	.01	-.04	.45**	.22**	.29**	.29**
Interdependence		1.00	.43**	.00	-.13**	.12*	.10*
Identity			1.00	-.05	-.20**	.08	.03
Feedback				1.00	.06	.44**	.36**
Pressure					1.00	.07	.03
Significance						1.00	.14**
Autonomy							1.00

* = p < .05

** = p < .01

the amount of skill variety (or some combination of work characteristics) is postulated to effect the nature of communication message or the strength of the relationship between the communication message and work performance.

For the reasons discussed previously in this section, overall job performance was selected as the work performance measure to be used in these initial analyses of the model. The communication factors were used as the communication content measures and the moderator scales as the work activity characteristics.

The first analysis was to compute zero-order correlations between the communication factors and the work performance measure for both the job and task data. TABLES 16 and 17 present these findings. These results support the contention that there is indeed a relationship between the frequency of communication and overall work performance, especially for superior-subordinate communication. For job performance, five of the seven supervisor communication scales are significantly related to performance and for task performance three of four scales are. All of these indicate more frequent communication to be related to higher performance. Written communication is positively related to performance at the job level only. Peer work group communication is less directly related to work performance.

These results are determined across all jobs taken together and indicate, as a very general statement, that frequency of certain types of communication are demonstrably related positively to work performance. However, from the practical viewpoint of supervisors it would be more advantageous to state that for a

TABLE 16
 Intercorrelations Between Communication Scales
 and Overall Job Performance

<u>Communication Scale</u>	<u>Correlation with Overall Job Performance</u>
<u>Supervisor</u>	
Positive Expression	.28**
Rationale	.13**
Negative Expression	.11*
Participation	.16**
Feedback	.13**
Direction	-.06
Information	.09
<u>Peer Work Group</u>	
Positive Expression	.09
Rationale	-.04
Negative Expression	.06
Participation	.23**
Feedback	.06
Direction	-.11*
Information	-.02
<u>Written Communication</u>	
Regulations	.10*
Job Specification	.11*
Job Information	.08

* = $p < .05$

** = $p < .01$

TABLE 17

Intercorrelations Between Communication Scales
and Overall Task Performance

<u>Communication Scale</u>	<u>Correlation with Overall Task Performance</u>
<u>Supervisor</u>	
Feedback	.18**
Rationale	.13**
Participation	.14**
Direction	-.05
<u>Peer Work Group</u>	
Feedback	.10
Rationale	.01
Participation	.20**
Direction	-.08
<u>Written Communication</u>	
Task Specification	.02
Task Information	.01

** = $p < .01$

specific type of work activity a particular pattern of communication has been found to relate to performance. It was toward this point that the next analysis, moderated regression analysis (Zedeck, 1971; and Kelinger and Pedhazur, 1973), was undertaken. In this analysis each of the moderator variables was entered into multiple regression equations with each of the communication factors separately and overall job/task performance predicted. This moderated regression analysis relates job/task performance to the combination of one moderator variable and one communication factor. The same relationship is then determined from the same two independent variables plus a third variable which is a dummy variable of the interaction of the two independent variables. If this second multiple regression equation accounts for significantly more of the job/task variance than the first equation, the conclusion is that the moderator variable differentially relates to job performance.

TABLE 18 summarizes the results from these job moderated regression analyses. When a large number of separate tests are conducted, as in this case, interpretation of results is somewhat tenuous because of the increased probability of Type I error. If each of the moderator variables is reviewed separately, inspection indicates that five of the moderator variables have either one or two significant t-test results. Adopting a moderate interpretation strategy, results indicate skill variety and pressure to not moderate the relationship between communication and performance. Three variables, identity, significance, and feedback appear to have intermediate effects on the relationship; while two variables, interaction and autonomy, have a very pronounced moderating effect. To further investigate

TABLE 18

T-test Results of Moderated Regressions for Job Performance

Communication Scale	Job Characteristic						
	Variety	Identity	Significance	Interaction	Autonomy	Pressure	Feedback
Positive Expression (S)	1.328	2.087**	1.318	.450	1.728*	.234	1.533
Rationale (S)	1.264	1.000	1.059	.222	.857	.143	.203
Negative Expression (S)	.101	.949	1.780*	.346	.449	1.415	.032
Participation (S)	1.165	.503	.388	.081	.675	.701	1.315
Feedback (S)	.40	1.534	.853	.570	.350	.337	.139
Direction (S)	.211	1.676*	1.698*	.609	.097	.702	.477
Information (S)	1.164	1.185	1.037	.126	.693	1.034	.827
Information (P)	.40	.426	.118	2.167**	.490	1.711*	.650
Positive Expression (P)	1.454	.987	.730	.503	1.921*	.407	2.05**
Participation (P)	2.972**	.068	1.003	1.67*	3.639**	.915	2.390**
Negative Expression (P)	.185	.659	1.453	1.37	.251	.729	.787
Feedback (P)	.586	.982	.357	2.14**	.734	1.117	.481
Direction (P)	1.018	1.548	1.369	1.025	.680	1.58	.305
Rationale (P)	.896	1.03	1.455	1.80*	.871	.652	.035
Regulations (W)	.172	.835	.499	1.576	.783	.882	.214
Job Specifications (W)	.658	.617	.591	.355	2.73**	1.005	.652
Job Information (W)	.068	.496	.226	.752	.825	.082	.147

S = supervisor

P = peer work group

W - written

*p = .1

**p = .05

these findings, two groups of respondents were identified, high and low performers. One group was those respondents who indicated that their jobs were characterized by a high amount of a given characteristic. The other group was those whose jobs were characterized by a small amount of the same characteristics. For each of these groups, correlations between communication factors and performance were calculated to examine any differences in the relationship between the two variables, assisting in the interpretation of the nature of the moderating effect of the work characteristic variable.

Due to the small samples, interpretation is of course tentative. However, it seems that in jobs characterized by high interaction with other workers, high amounts of peer group communication in terms of information, participation, feedback, and rationale are related to higher performance. This makes sense in that if the nature of the job is working with others then these specific communication factors should greatly facilitate successful performance of all. Peer communication could easily be argued to be of more importance in such activities than superior communication. In activities described as highly autonomous, peer positive expression and participation seem to be strongly positively related to performance as does positive expression from the superior. An inverse relationship seems to accompany the use of written job specifications however. Again these findings make intuitive sense in that given a highly autonomous job very little specific job related communication can be provided by either superiors or peers. Non-task communication (positive expression) and general interchange

(peer participation) would be more appropriate. It is also not surprising to find that in these jobs extensive use of fixed materials would be ill-suited for high performance.

Regarding other work characteristics, the more the job was characterized by feedback, the stronger the positive relationships between peer positive expression, peer participation and performance. In jobs characterized by low amounts of identity or significance positive performance is related to supervisory direction. This is not the case for jobs characterized by high identity or significance however. In these jobs supervisory expression seems to be strongly related to performance.

The same analyses were performed for overall task performance. TABLE 19 presents the moderated regression analyses. Fewer moderated effects were determined at this level than at the job level. A general, again tentative, summary would be that a high level of task significance, feedback, or pressure increases the positive relationship between certain peer communication scales and performance. The relationship between superior communication and performance seems not to be notably affected by task characteristics, with the possible exception of high identity and high autonomy increasing the positive relationship between superior participation and performance.

TABLE 19

T-test Results of Moderated Regressions for Task Performance

Communication Scale	Skill Variety	Task Characteristic						
		Identity	Significance	Interaction	Autonomy	Pressure	Feedbac	
Feedback (S)	.687	1.637	.546	.481	.158	.242	.905	
Rationale (S)	.965	.750	.366	.281	.795	.430	.127	
Participation (S)	.943	1.890*	.029	.290	1.826*	1.116	.387	
Direction (S)	.462	.385	.755	1.054	1.099	.074	.203	
Feedback (P)	.649	.145	.941	.303	.304	.645	.823	
Participation (P)	.966	.190	.249	.021	.206	.459	.361	
Direction (P)	.050	.465	1.759*	.581	.352	.194	.927	
Rationale (P)	.185	.503	2.362**	.848	.359	1.785*	2.200**	
Written Specifications (T)	.529	1.271	.054	.054	1.228	.265	.074	
Written Information (T)	.721	.755	.660	.191	.522	.765	1.381	

* = p < .05

** = p < .01

Summary

The present project has been successful as a preliminary testing of the Communication - Productivity Model and has produced results that both support the model and provide useful, although tentative, information to Air Force maintenance supervisors. The major results are summarized in the following paragraphs.

1. In terms of response patterns, adequate measures of overall individual performance were developed. Analyses indicated the scales to be free of rater bias in terms of leniency and restriction of range.
2. The overall individual performance scales, by posing specific questions regarding several aspects of quality and quantity of performance, seem to have acceptable content validity and make conceptual sense to supervisors. Determination of empirical validity relationships with other indicants of individual performance would be desirable if such could be identified.
3. The measurement of overall job performance seems to be more stable and to be less affected by response patterns than does measurement of task performance.
4. The seven Communication Scales are stable in describing communication from superiors, peer groups, and written sources. These scales demonstrate consistent, factor patterns of communication and individual scales seem to be free from common response bias.
5. Support for the main tenets of the model was also demonstrated. First, the frequency of specific communication at both the task and the job level is directly related to job performance. Secondly, the tenet that such a relationship is affected by measurable characteristics of the work activity was also supported, especially for job performance. High amounts of certain work characteristics usually strengthened the relationship between communication and performance, especially regarding peer group communication. This makes intuitive sense for many Air Force maintenance jobs. Those jobs requiring large amounts of interaction with other specialists could, logically, be dependent on the amount of communication from co-workers. Similarly, for other jobs the necessary mobility and frequent change of work group supervisors in Air Force maintenance operations would place more emphasis on peer group communication.

A much more extensive investigation would have to be undertaken before more complete findings can be specified. One of the major limitations of the current project was the small scale of data collection possible given time and funding constraints. A more definitive testing of the Communication - Productivity Model would entail the generation of groups of jobs homogeneous in terms of reported characteristics. Regression analyses could then identify the most related communication factors for each group of jobs. Statements could then be made regarding the specific communication most related to individual performance for specific groups of jobs. Such analyses, of course, would require a large data base.

It also appears that results were somewhat mitigated by the problems associated with the measurement of work characteristics. Further work should be done on the development of better measures. The present set of seven had the problems of skewness in rater responses, (although the possibility exists that in fact little variance exists on these job characteristics in Air Force jobs) and also lack of independence among the factors. Factor analyses of both job and task data did not support the identification of seven distinct work characteristics. Additional interviews with both technicians and supervisors, as well as a review of other efforts to measure work characteristics, would be appropriate.

The present work would constitute a necessary base for this more extensive effort.

References

- Adam, E.E. "Behavior Modification in Quality Control," Academy of Management Journal, Vol. 18 (1975), 662-679.
- Berlo, D.K. The Process of Communication (New York: Holt, Rinehart, and Winston, 1960).
- Bragg, J.E. and I.R. Andrews. "Participative Decision Making: An Exploratory Study in a Hospital," Journal of Applied Behavioral Science, Vol. 9 (1973), 727-735.
- Cartwright, D. and A. Zander. Group Dynamics: Research and Theory, 3rd edition (New York: Harper and Row, 1968).
- Davis, Keith. Human Behavior at Work: Human Relations and Organizational Behavior (New York: McGraw-Hill, 1978).
- Golembiewski, Robert T. "Small Groups and Large Organizations," in James G. March (Ed.), Handbook of Organizations (Chicago: Rand McNally, 1965).
- Guion, Robert M. Personnel Testing (New York: McGraw-Hill, 1965).
- Hackman, J.R. and G. Oldham. "The Job Diagnostic Survey: An Instrument for the Diagnosis of Jobs and the Evaluation of Job Redesign Projects," Technical Report No. 4, Department of Administrative Sciences (Yale University, 1974).
- Hackman, J.R. and G. Oldham. "Motivation Through the Design of Work: Test of a Theory," Organizational Behavior and Human Performance (1976), 16, 250-279.
- Haire, Mason. Psychology in Management (New York: McGraw-Hill, 1964).
- Hautaluoma, J.E. and J.F. Gavin. "Effects of Organizational Diagnosis and Intervention on Blue-Collar 'Blues'," Journal of Applied Behavioral Science, Vol. 11 (1975), 475-498.
- Hundal, P. "Knowledge of Performance as an Incentive in Repetitive Industrial Work," Journal of Applied Psychology, Vol. 53 (1969), 224-226.
- Huseman, R.C., J.D. Hatfield and R.D. Gatewood. "A Conceptual Framework for Analyzing the Communication-Productivity Relationship," Working Paper (University of Georgia, Department of Management, 1978).
- Huseman, R., J. Hatfield, W. Boulton and R. Gatewood. "Development of a Conceptual Framework Analyzing the Communication-Performance Relationships," Proceedings of the Academy of Management (1980).

- Ivancevich, J.M. "Changes in Performance in a Management by Objective Program," Administrative Science Quarterly, Vol. 19 (1974), 563-574.
- Katz, D. and R. Kahn. The Social Psychology of Organizations (New York: Wiley, 1966).
- Katzell, R.A., P. Bienstock and P.H. Faerstein. A Guide to Worker Productivity Experiments in the United States, 1971-1975 (New York: New York University Press, 1977).
- Katzell, R.A. and D. Yankelovich. Work, Productivity and Job Satisfaction: An Evaluation of Policy-Related Research (New York: The Psychological Corporation, 1975).
- Kelley P. and M. Kranzberg. Technological Innovation: A Critical Review of Current Knowledge (Atlanta, Georgia: Advanced Technology and Science Studies Group, Georgia Institute of Technology, 1975).
- Kerlinger, F.N. and E.J. Pedhazur. Multiple Regression in Behavioral Resources (New York: Holt, Rinehart and Winston, Inc., 1973).
- Kim, J. and W.C. Hamner. "Effect of Performance Feedback and Goal Setting on Productivity and Satisfaction in an Organizational Setting," Journal of Applied Psychology, Vol. 61 (1976), 48-57.
- Latham, G.P. and G.A. Yukl. "Effects of Assigned and Participative Goal Setting on Performance and Job Satisfaction," Journal of Applied Psychology (1976), 61, 166-171.
- Lawler, C.E., III. "The Multitrait-Multirater Approach to Measuring Managerial Job Performance," Journal of Applied Psychology (1977), SI, 369-381.
- Leavitt, Harold J. Managerial Psychology, 3rd edition (Chicago: University of Chicago Press, 1972).
- Likert, R. New Patterns of Management (New York: McGraw-Hill, 1961).
- March, J. and H. Simon. Organizations (New York: Wiley Co., 1958).
- Migliore, R.H. "Improving Worker Productivity Through Communicating Knowledge of Work Results," Human Resource Management (Summer, 1970).
- McCormick, E.J. "Job and Task Analysis," in Marvin D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology (Chicago: Rand McNally, 1976).

- McGregor, D. The Human Side of Enterprise (New York: McGraw-Hill, 1960).
- Pacilio, J. "The Effect of Three Methods of Instruction on Task Performance," Proceedings of the Academy of Management (1977), 380-390.
- Poole, M.S. "An Information-Task Approach to Organizational Communication," Academy of Management Review, Vol. 3 (1978), 493-505.
- Powell, R.M. and J.L. Schlacter. "Participative Management - A Panacea?" Academy of Management Journal, Vol. 14 (1971), 165-173.
- Sashkin, M. "Changing Toward Participative Management: A Model and Methods," Academy of Management Review, Vol. 1 (1976), 75-86.
- Schuler, R. and L. Blank. "Relationships Among Types of Communication, Organizational Level, and Employee Satisfaction and Performance," IEE Transactions on Engineering Management, Vol. 23 (1976), 124-129.
- Shannon, C. and W. Weaver. The Mathematical Theory of Communication (Champaign-Urbana: University of Illinois Press, 1949).
- Shaw, Marvin E. Group Dynamics: The Psychology of Small Group Behavior (New York: McGraw-Hill, 1976).
- Smith, Patricia C. "Behaviors, Results, and Organizational Effectiveness: The Problem of Criteria," in Marvin D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology (Chicago: Rand McNally, 1976).
- Sorcher, M. "Motivation on the Assembly Line," Personnel Administration, Vol. 32 (1969), 40-48.
- Tushman, M. "Technical Communication in Research and Development Laboratories: The Impact of Task Characteristics," Academy of Management Journal (1978), 21, 624-645.
- Wexley, K.N. and W.F. Nemeroff. "Effectiveness of Positive Reinforcement and Goal Setting as Methods of Management Development," Journal of Applied Psychology, Vol. 60 (1975), 446-450.
- Zedeck, S. "Problems with the Use of Moderator Variables," Psychological Bulletin (1971), 76, 295-310.

Appendix A

Communication Assessment Package

Part A

COMMUNICATION ASSESSMENT PACKAGE**PART A**

THE QUESTIONS IN THIS BOOKLET ASK ABOUT YOU, YOUR JOB, AND YOUR WORK GROUP. WHEN ANSWERING THESE QUESTIONS PLEASE KEEP IN MIND THE TOTAL REQUIREMENTS OF YOUR JOB. REMEMBER AGAIN THAT ALL YOUR ANSWERS WILL BE KEPT CONFIDENTIAL.

SECTION I

The first section of this survey concerns your background. Please print the information requested or check the applicable blocks.

1. EMPLOYEE NUMBER _____ 2. GRADE _____
3. How many months of technical training have you had for your DAFSC? _____
- | | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| E1 | E2 | E3 | E4 | E5 | E6 | E7 | E8 | E9 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AB | AMN | AIC | SGT | SSGT | TSGT | MGST | SMSGT | CMSGT |
4. On your present job, how often do you use this training?
- ____ a. Always
 ____ b. Frequently
 ____ c. Occasionally
 ____ d. Seldom
 ____ e. Never
5. DAFSC _____
- Prefix _____ Suffix _____
6. Do you plan to re-enlist at the end of your current enlistment?
- ____ a. Definitely Will
 ____ b. Probably Will
 ____ c. Probably Will Not
 ____ d. Definitely Will Not
 ____ e. Will Retire
7. Total months in present job _____ 8. Does your supervisor actually write your performance report? YES _____
 NO _____
9. Your Squadron _____ 10. Your Work Section _____

SECTION II

Listed below are a number of statements that could describe your job. Please indicate whether each statement is an accurate or inaccurate description of your job. Try to be as accurate as you can regardless of whether you like or dislike your job.

Write a number in the blank beside each statement, based on the following scale:

1	2	3	4	5
Very Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Very Accurate

- ____ 1. The job requires me to use a number of complex or high-level skills.
- ____ 2. The job requires a lot of cooperative work with other people.
- ____ 3. The job is arranged so that I do not have the chance to do an entire piece of work from beginning to end.
- ____ 4. Just doing the work required by the job provides many chances for me to figure out how well I am doing.
- ____ 5. It is easy for me to keep up with the pace of my job.

- ___ 6. The job can be done adequately by a person working alone—without talking or checking with other people.
- ___ 7. This job is one where a lot of other people can be affected by how well the work gets done.
- ___ 8. The job denies me any chance to use my personal initiative or judgment in carrying out the work.
- ___ 9. The job provides very few clues about whether or not I am performing well.
- ___ 10. The job provides me the chance to completely finish the pieces of work I begin.
- ___ 11. The job gives me considerable opportunity for independence and freedom in how I do the work.
- ___ 12. The job itself is not very significant or important in the broader scheme of things.
- ___ 13. The job is quite simple and repetitive.
- ___ 14. The job never lets me get caught up with the work load.
- ___ 15. What is your basic work schedule?
- a. Day shift work
 - b. Night shift work
 - c. Swing shift work
 - d. Crew schedule
- ___ 16. To what extent in your work group are group meetings used to solve problems and establish goals and objectives?
- a. Always
 - b. Frequently
 - c. Occasionally
 - d. Seldom
 - e. Never

SECTION III

The statements below deal with the work performance of your work group. Using the following scale, write the number in the blank next to each statement that best shows this performance.

- 1 = Much Better
- 2 = Better
- 3 = About the Same
- 4 = Worse
- 5 = Much Worse

IN COMPARISON WITH OTHER WORK GROUPS:

1. The quantity of output of my work group is _____.
2. The quality of output of my work group is _____.
3. When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do _____ in handling these situations.
4. My work group's use of available resources, for example personnel and material, is _____.
5. My work group's overall performance is _____.

The statements below deal with your own ideas about your performance. Please answer each statement as objectively as you can. Remember that your responses will be kept completely confidential. For each statement, place a check in the blank that best describes how you compare with others in your work group.

1. The amount of work that I turn out is :
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than everyone else

2. The number of errors that I make is:
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than everyone else

3. When evaluated or operationally tested my work is satisfactory:
 - a. More often than anyone else
 - b. More often than most others
 - c. About the same as others
 - d. Less often than most others
 - e. Less often than everyone else

4. The amount of time that I take to do my job is:
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than everyone else

5. The number of times I repeat the same errors is:
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than everyone else

6. If the workload requires additional time, I am willing to spend the time necessary to accomplish the work:
 - a. More often than anyone else
 - b. More often than most others
 - c. About the same as others
 - d. Less often than most others
 - e. Less often than everyone else

7. In general, on the job I am able to:
 - a. Carry out simple adjustments
 - b. Make major adjustments
 - c. Make complex adjustments/alignments
 - d. Frequently trouble shoot and repair problems
 - e. Trouble shoot and repair the most complex problems

8. I am committed to the military discipline necessary to accomplish my role in the overall mission of my unit:
 - a. More so than anyone else
 - b. More so than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than anyone else

SECTION IV

The following statements describe different kinds of communication that might take place on your job. Circle the letter in the right hand margin which best describes how frequently each statement occurs. Keep in mind that communication could occur in face-to-face conversations, in group meetings, or through written means, such as a memorandum or a bulletin board posting. Use the following scale to indicate the frequency that each statement occurs, and circle the appropriate letter.

A = Always
 F = Frequently
 O = Occasionally
 S = Seldom
 N = Never

A. Communication With Supervisor

- | | |
|----------------------------------------------------------------------------------------|-----------|
| 1. My supervisor gives me specific performance objectives. | A F O S N |
| 2. My supervisor schedules my work. | A F O S N |
| 3. My supervisor sets the deadlines I have to meet. | A F O S N |
| 4. My supervisor tells me what materials and equipment to use when doing my work. | A F O S N |
| 5. My supervisor tells me what steps to follow when doing my work. | A F O S N |
| 6. My supervisor informs me about rules and policies. | A F O S N |
| 7. My supervisor informs me about service benefits. | A F O S N |
| 8. My supervisor informs me about future plans for my work group. | A F O S N |
| 9. My supervisor informs me about our Wing's plans for the future. | A F O S N |
| 10. My supervisor lets me know how other work groups are doing. | A F O S N |
| 11. I question my supervisor's instructions when I don't understand them. | A F O S N |
| 12. I make suggestions to my supervisor about how my work should be done. | A F O S N |
| 13. I question my supervisor's instructions when I think they're wrong. | A F O S N |
| 14. I tell my supervisor about my own work problems. | A F O S N |
| 15. My supervisor asks me for my opinions about how work should be done. | A F O S N |
| 16. I tell my supervisor about problems in my work group. | A F O S N |
| 17. My supervisor lets me know when I have done a good job. | A F O S N |
| 18. My supervisor discusses with me what I need to do to get promoted. | A F O S N |
| 19. My supervisor lets me know when I'm working well with others. | A F O S N |
| 20. My supervisor tells me what he/she thinks about my attitude toward my job. | A F O S N |
| 21. My supervisor expresses appreciation to me for work well done. | A F O S N |
| 22. My supervisor criticizes my work in front of other workers. | A F O S N |
| 23. My supervisor ridicules or makes fun of me. | A F O S N |
| 24. My supervisor apologizes when he/she makes a mistake that causes me embarrassment. | A F O S N |
| 25. My supervisor is critical of me. | A F O S N |

26. My supervisor asks me to do things rather than tells me. A F O S N
27. My supervisor tells me why the job is to be done. A F O S N
28. My supervisor tells me the reasons for his/her view of my performance. A F O S N
29. My supervisor tells me the reasons for rules and policies. A F O S N
30. My supervisor tells me why changes are made in quality standards. A F O S N
31. My supervisor tells me why changes are made in work assignments. A F O S N
32. My supervisor tells me the reasons for work schedules. A F O S N
33. My supervisor strikes up casual conversations with me. A F O S N
34. My supervisor jokes good naturedly with me. A F O S N
35. My supervisor talks to me about his/her interests outside of work. A F O S N
36. My supervisor asks me about my family. A F O S N
37. My supervisor asks me about my interest outside of work. A F O S N
38. My supervisor expresses sympathy when something unfortunate happens in my personal life. A F O S N

B. Communication With Fellow Workers

1. I check with my fellow workers before performing a job. A F O S N
2. I check with my fellow workers about what material and equipment to use when doing my work. A F O S N
3. My fellow workers tell me what steps to follow when doing my work. A F O S N
4. My fellow workers give me information about rules and policies. A F O S N
5. My fellow workers discuss with me problems in doing their job. A F O S N
6. My fellow workers inform me about service benefits. A F O S N
7. My fellow workers inform me about future plans for our work group. A F O S N
8. My fellow workers inform me about our Wing's plans for the future. A F O S N
9. My fellow workers let me know how other work groups are doing. A F O S N
10. I make suggestions to my fellow workers about how work should be done. A F O S N
11. My fellow workers ask me for suggestions about how work should be done. A F O S N
12. I tell my fellow workers about my own work problems. A F O S N
13. My fellow workers ask me for my opinions. A F O S N
14. I tell my fellow workers about problems in our work group. A F O S N
15. I tell my fellow workers when I think they're doing things wrong. A F O S N
16. My fellow workers let me know when I have done a good job. A F O S N
17. My fellow workers tell me what I need to do to get promoted. A F O S N
18. My fellow workers let me know when I am working well with them. A F O S N

19. My fellow workers let me know how I compare with them. A F O S N
20. My fellow workers tell me what they think about my attitude toward the job. A F O S N
21. My fellow workers express appreciation to me for work well done. A F O S N
22. My fellow workers criticize my work in front of each other. A F O S N
23. My fellow workers ridicule or make fun of me. A F O S N
24. My fellow workers admit to mistakes when they are at fault. A F O S N
25. My fellow workers apologize when they make a mistake that causes me embarrassment. A F O S N
26. My fellow workers are critical of me. A F O S N
27. My fellow workers ask me to do things rather than tell me. A F O S N
28. My fellow workers tell me why the job is to be done. A F O S N
29. I find out reasons for rules and policies from my fellow workers. A F O S N
30. My fellow workers tell me the reasons for their view of my performance. A F O S N
31. My fellow workers tell me why changes are made in quality standards. A F O S N
32. My fellow workers tell me why changes are made in work assignments. A F O S N
33. My fellow workers tell me reasons for work schedules. A F O S N
34. My fellow workers strike up casual conversations with me. A F O S N
35. My fellow workers greet me whenever I first enter the work area. A F O S N
36. My fellow workers joke good naturedly with me. A F O S N
37. My fellow workers talk to me about their interests outside of work. A F O S N
38. My fellow workers ask me about my family. A F O S N
39. My fellow workers ask me about my interests outside of work. A F O S N
40. My fellow workers express sympathy to me when something unfortunate happens in my personal life. A F O S N

C. Communication From Other Sources

1. I use the technical manuals/technical orders to identify specific performance objectives. A F O S N
2. I use the technical manuals/technical orders to schedule my work. A F O S N
3. I check the technical manuals/technical orders before performing a job. A F O S N
4. I use the technical manuals/technical orders to find out about quality standards for my work. A F O S N
5. I use the technical manuals/technical orders to find out what materials and equipment to use. A F O S N
6. I use the technical manuals/technical orders to find out what steps to follow when doing my work. A F O S N

7. I use the technical manuals/technical orders to find out why jobs are to be done. A F O S N
8. I use the technical manuals/technical orders to find out why changes are made in quality standards. A F O S N
9. I use the Air Force regulations/manuals to find out about rules and policies. A F O S N
10. I use the Air Force regulations/manuals to find out about service benefits. A F O S N
11. I use the Air Force regulations/manuals to find out reasons for rules and policies. A F O S N
12. I use test equipment to tell me when I have done a good job. A F O S N

Appendix B

Communication Assessment Package

Part B

COMMUNICATION ASSESSMENT PACKAGE**PART B**

ATTACHED TO THIS BOOKLET IS A LIST OF DAFSCs AND CERTAIN TASKS THAT ARE DONE BY INDIVIDUALS WITHIN THESE DAFSCs. BEFORE ANSWERING THE QUESTIONS IN THIS BOOKLET, PLEASE FIND YOUR DAFSC. THEN FROM THE LIST OF TASKS UNDER THIS DAFSC CHOOSE THE ONE TASK THAT YOU DO MOST FREQUENTLY. PLEASE KEEP THIS TASK IN MIND WHEN ANSWERING THE QUESTIONS IN THIS BOOKLET. AGAIN REMEMBER THAT YOUR ANSWERS WILL BE KEPT CONFIDENTIAL. THANK YOU FOR YOUR COOPERATION.

SECTION I

Please select from the attached list of tasks the one task which you do most frequently.
Write the name of that task on the line below as it appears on the list, and
Describe briefly your function in carrying out that task.

TASK: _____

FUNCTION _____

I spend approximately _____% of my time doing this task each month.
How many months experience do you have doing this task? _____
How frequently do you do this task each month? _____ (times per month.)

Listed below are a number of statements which could be used to describe this task. Please indicate whether each statement is an accurate or inaccurate description of the task identified above. Be as objective as you can in deciding how accurately each statement describes the task--regardless of whether you like or dislike the task. Write a number in the blank beside each statement, based on the following scale:

1	2	3	4	5
Very Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Very Accurate

- _____ 1. The task requires me to use a number of complex or high-level skills.
- _____ 2. The task requires a lot of cooperative work with other people.
- _____ 3. The task is arranged so that I do not have the chance to do an entire piece of work from beginning to end.
- _____ 4. Just doing the work required by the task provides many chances for me to figure out how well I am doing.
- _____ 5. The task is quite simple and repetitive.
- _____ 6. The task can be done adequately by a person working alone--without talking or checking with other people.
- _____ 7. This task is one where a lot of people can be affected by how well the work gets done.
- _____ 8. The task denies me any chance to use my personal initiative or judgment in carrying out the task.
- _____ 9. The task provides very few clues about whether or not I am performing well.
- _____ 10. The task provides me the chance to completely finish the pieces of work I begin.
- _____ 11. This is a fairly simple task that requires little training.
- _____ 12. The task gives me considerable opportunity for independence and freedom in how I do the work.
- _____ 13. The task itself is not very significant or important in the broader scheme of things.
- _____ 14. It is easy for me to keep up with the pace of the task.
- _____ 15. I can get specific instructions about every step in doing this task.
- _____ 16. It is important that I maintain very close tolerance levels when completing this task.
- _____ 17. The ways of doing this task never change.
- _____ 18. This task requires me to do a lot of thinking on my own.

- 19. New technical orders or procedures are frequently issues for this task.
- 20. This task does not require exacting limits or tolerance.
- 21. This is a highly technical task that requires extensive training.
- 22. When I am working on this task, it is not necessary for me to maintain a strict military standard.
- 23. Working on this task is dangerous.
- 24. The physical conditions under which I work on this task are uncomfortable.

SECTION II

The statements below deal with the performance of your work group on this task. Using the following scale, write the number in the blank next to each statement that best shows the performance of your work group.

- 1 - Superior
- 2 - Above Average
- 3 - Average
- 4 - Below Average
- 5 - Poor

- 1. The quantity of output of my work group on this task is _____.
- 2. The quality of output of my work group on this task is _____.
- 3. My work group's use of time and materials in completing this task is _____.
- 4. My work group's overall performance on this task is _____.
- 5. When high priority work occurs on this task such as *short suspenses, crash programs, and schedule changes*, the performance of my work group is _____.

The statements below deal with your own performance on this task. Please answer each statement as objectively as you can. In answering these questions, think about your work in comparison with others in your work group that perform this task. Place a check mark in the blank that best shows your performance for each statement.

- 1. The amount of work that I turn out on this task is:
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than anyone else

- 2. The number of errors that I make in doing this task is:
 - a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than anyone else

- 3. My work on this task performs satisfactory when evaluated or operationally tested:
 - a. More often than anyone else
 - b. More often than most others
 - c. About the same as others
 - d. Less often than most others
 - e. Less often than anyone else

- 00
4. The time that I take to do this task is:
- a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than anyone else
5. I repeat the same errors when doing this task:
- a. More than anyone else
 - b. More than most others
 - c. About the same as others
 - d. Less than most others
 - e. Less than anyone else
6. If the workload on this task requires additional time, I am willing to spend additional time to accomplish this task:
- a. More often than anyone else
 - b. More often than most others
 - c. About the same as others
 - d. Less often than most others
 - e. Less often than anyone else
7. In general, on this task I am able to:
- a. Carry out simple adjustments
 - b. Make major adjustments
 - c. Make complex adjustments/alignments
 - d. Frequently trouble shoot and repair problems
 - e. Trouble shoot and repair the most complex problems

SECTION III

The following statements describe different kinds of communication that might happen when you are carrying out the task identified at the beginning of this section. Circle each letter in the right-hand margin which best describes how frequently each item occurs.

Use the following scale to indicate the frequency that each statement occurs:

A = Always
 F = Frequently
 O = Occasionally
 S = Seldom
 N = Never

A. Communication With Supervisor

- | | |
|-----------------------------------------------------------------------------------|-----------|
| 1. My supervisor gives-me specific performance objectives. | A F O S N |
| 2. My supervisor schedules my task. | A F O S N |
| 3. My supervisor sets the deadlines I have to meet. | A F O S N |
| 4. My supervisor tells me what materials and equipment to use when doing my task. | A F O S N |
| 5. My supervisor tells me what steps to follow when doing the task. | A F O S N |
| 6. I question my supervisor's instructions when I don't understand them. | A F O S N |
| 7. I make suggestions to my supervisor about how my task should be done. | A F O S N |
| 8. I question my supervisor's instructions when I think they're wrong. | A F O S N |
| 9. I tell my supervisor my own work problems. | A F O S N |

10. My supervisor asks me for my opinions about how the task should be done. A F O S N
11. I tell my supervisor about problems in my work group. A F O S N
12. My supervisor lets me know when I have done a good job on the task. A F O S N
13. My supervisor lets me know when I'm working well with others. A F O S N
14. My supervisor tells me what he/she thinks about my attitude toward my task. A F O S N
15. My supervisor expresses appreciation to me for work well done. A F O S N
16. My supervisor tells me why the task is to be done. A F O S N
17. My supervisor tells me the reasons for his/her view of my performance on the task. A F O S N
18. My supervisor tells me why changes are made in quality standards. A F O S N
19. My supervisor tells me why changes are made in work assignments. A F O S N
20. My supervisor tells me the reasons for work schedules. A F O S N

B. Communication With Fellow Workers

1. I check with my fellow workers before performing the task. A F O S N
2. I check with my fellow workers about what materials and equipment to use when doing the task. A F O S N
3. My fellow workers tell me what steps to follow when doing the task. A F O S N
4. I make suggestions to my fellow workers about how the task should be done. A F O S N
5. My fellow workers ask me for suggestions about how the task should be done. A F O S N
6. I tell my fellow workers about my own work problems. A F O S N
7. My fellow workers ask me for my opinions. A F O S N
8. I tell my fellow workers about problems in our work group doing this task. A F O S N
9. I tell my fellow workers when I think they're doing the task wrong. A F O S N
10. My fellow workers let me know when I have done a good job on the task. A F O S N
11. My fellow workers let me know when I'm not working well with them. A F O S N
12. My fellow workers let me know when I am working well with them. A F O S N
13. My fellow workers let me know how I compare with them. A F O S N
14. My fellow workers express appreciation to me for work well done. A F O S N
15. My fellow workers tell me why the task is to be done. A F O S N
16. My fellow workers tell me the reasons for their view of my performance on the task. A F O S N
17. My fellow workers tell me why changes are made in quality standards. A F O S N
18. My fellow workers tell me why changes are made in work assignments. A F O S N
19. My fellow workers tell me reasons for work schedules. A F O S N

C. Communication From Other Sources

1. I use the technical manuals/technical orders to identify specific performance objectives. A F O S N
2. I use the technical manuals/technical orders to schedule my task. A F O S N
3. I check the technical manuals/technical orders before performing a task. A F O S N
4. I use the technical manuals/technical orders to find out about quality standards for the task. A F O S N
5. I use the technical manuals/technical orders to find out what materials and equipment to use on the task. A F O S N
6. I use the technical manuals/technical orders to find out what steps to follow when doing the task. A F O S N
7. I use the technical manuals/technical orders to find out why the task is to be done. A F O S N
8. I use the technical manuals/technical orders to find out why changes are made in quality standards. A F O S N
9. I use test equipment to tell me when I have done a good job on the task. A F O S N

Appendix C

Supervisor's Questionnaire

COMMUNICATION ASSESSMENT PACKAGE

SUPERVISOR'S QUESTIONNAIRE

THE ATTACHED QUESTIONNAIRES ARE AN EXTREMELY IMPORTANT PART OF A PROJECT BEING CONDUCTED BY THE UNIVERSITY OF GEORGIA AND THE UNITED STATES AIR FORCE. THE PROJECT IS TRYING TO DETERMINE WHAT THE RELATIONSHIP IS BETWEEN THE KINDS OF COMMUNICATION THAT AIR FORCE PERSONNEL GET AND THEIR WORK PERFORMANCE.

THESE QUESTIONNAIRES ASK YOU TO RATE THE WORK PERFORMANCE OF SOME OF THE PEOPLE IN YOUR WORK GROUP. IT IS IMPORTANT TO THE PROJECT THAT THESE RATINGS REFLECT DIFFERENCES IN WORK PERFORMANCE. PLEASE TRY TO AVOID RATING ALMOST ALL WORKERS THE SAME.

YOUR ANSWERS WILL BE KEPT COMPLETELY CONFIDENTIAL, AND NO INDIVIDUAL INFORMATION WILL BE REPORTED. INFORMATION WILL BE ANALYZED FOR SIMILAR TYPES OF JOBS OF SEVERAL BASES. COMPARISONS WILL NOT BE MADE BETWEEN DEPARTMENTS, SECTIONS, OR BASES. WE WILL REPORT OUR FINDINGS DIRECTLY TO YOUR BASES WITHIN SIX MONTHS. WE SINCERELY APPRECIATE YOUR COOPERATION.

USAF SCN 79-130 (EXPIRES 31 JULY, 1980)

Overall Performance Rating

Worker: _____

This first section asks you to make judgments about the overall work performance of the person listed above. That is, you should think about this worker's performance, taking into account everything he/she does. Again, please remember that this information is for project purposes only, and no individual data will be reported or disclosed.

It is important to the project that your ratings accurately describe the performance of this individual in relation to others in your work group.

1. The amount of work this person turns out is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than everyone else
2. The number of errors this person makes is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than everyone else
3. When evaluated or operationally tested, this person's work is found to be satisfactory
 - _____ a. More often than anyone else
 - _____ b. More often than most others
 - _____ c. About the same as others
 - _____ d. Less often than most others
 - _____ e. Less than everyone else
4. The amount of time this person takes to do his/her job is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than everyone else
5. The number of times this person repeats the same errors on his/her job is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else
6. If the workload requires additional time, how often is this person willing to spend the time necessary to accomplish the work?
 - _____ a. More often than anyone else
 - _____ b. More often than most others
 - _____ c. About the same as others
 - _____ d. Less often than most others
 - _____ e. Less often than anyone else
7. In general, on this task, this person is able to:
 - _____ a. Carry out simple adjustments
 - _____ b. Make major adjustments
 - _____ c. Make complex adjustments/alignments
 - _____ d. Frequently trouble shoot and repair problems
 - _____ e. Trouble shoot and repair the most complex problems
8. This person's commitment to the military discipline necessary to accomplish his/her role in the overall mission of the unit is:
 - _____ a. More so than anyone else
 - _____ b. More so than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else

SECTION II

Individual Performance Rating

Worker: _____

Task: _____

This section also asks you to make judgments about the same individual. However, instead of judging overall job performance, we would like you to judge work performance on only one specific task. The task is the one under the person's name above. Again remember that all answers will be kept confidential.

1. The amount of work this person turns out on this task is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else

2. The number of errors this person makes on this task is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else

3. On this task, when this person's work is evaluated or operationally tested, how often is the work satisfactory?
 - _____ a. More often than anyone else
 - _____ b. More often than most others
 - _____ c. About the same as others
 - _____ d. Less often than most others
 - _____ e. Less often than anyone else

4. The time this person takes to do the task is:
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else

5. How often does this person repeat the same errors on this task?
 - _____ a. More than anyone else
 - _____ b. More than most others
 - _____ c. About the same as others
 - _____ d. Less than most others
 - _____ e. Less than anyone else

6. If the workload requires additional time for this task, how often is the person willing to spend additional time to accomplish the task?
 - _____ a. More often than anyone else
 - _____ b. More often than most others
 - _____ c. About the same as others
 - _____ d. Less often than most others
 - _____ e. Less than anyone else

7. In general, on this task this person is able to:
 - _____ a. Carry out simple adjustments
 - _____ b. Make major adjustments
 - _____ c. Make complex adjustments/alignments
 - _____ d. Frequently trouble shoot and repair problems
 - _____ e. Trouble shoot and repair the most complex problems

Appendix D

List of DAFSC's and Tasks

A. AIRCRAFT GENERATION SQUADRON

DAFSC - 321

- Troubleshoot ECM System
- OPS check UHF System
- Issue T. O.
- Order parts
- Issue tool box

DAFSC - 326

- Ordering T.D.'s
- OPS check IFF System
- OPS check ICMS System
- OPS check ILS System
- OPS check UHF Radios
- BIT check Radar System
- BIT check IFF System
- Perform FLIT check of Flight Controls
- Troubleshoot ECM System
- Troubleshoot COMM/NAV System

DAFSC - 328

- Issue Tool Box

DAFSC - 423

- Install IDG
- Remove/replace cabin air inlet valve
- Remove/replace utility hydraulic pumps
- Issue T.O.
- Order parts

DAFSC - 426

- Remove/replace engine nozzle segments
- Troubleshoot engine malfunction
- Troubleshoot secondary power system
- Remove/replace engine
- Check out jet engines

DAFSC - 431

- Order parts
- Issue tool box
- Launch/recovery
- Swing shift supervisor
- Thru flights
- Aircraft engine run
- Refuel aircraft
- Preflight
- Basic post flight inspection
- EMO custodian, issue/receipt special equipment
- Issue/receipt special equipment/bench stock monitor
- Issue/receipt special equipment/PMEL monitor
- Check status of parts
- Posting a T.O. change
- End of runway check
- Inspect intakes
- Service Lox System

DAFSC - 442

- Maintain release/Gun Systems, Upload/Download weapons
- End of runway check
- Initial issue letters
- Receiving parts
- Ordering parts
- Signing out tool boxes
- Signing in tool boxes

- Initiating cost tool procedures
- AWM 75 check
- Download Cap 9
- Remove LAU 114
- Perform ACS BIT check
- Remove/install inboard pylon
- Assist load M61A Gun
- Assist load AIM-9
- Assist Download Center Line Tank
- Perform 72 check
- Perform AIM-7F Upload
- Perform 20 mm Ammo Upload
- Assist 75 check
- Assist AIM-9 Download
- Issue/receipt special equipment/bench stock
- Install Impulse Carts
- Install LAU-114 Rails
- Acceptance inspection

B. COMPONENT REPAIR SQUADRON

DAFSC - 321

- Bench check/repair of TACAN R/T
- Bench check/repair of radar antenna
- Bench check of radar transmitter
- Bench check of fuel quantity indicators

DAFSC - 325

- Weekly inspections of test stations

DAFSC - 326

- Bench check/repair LRU-9 (TEWS display)
- Perform OA/FT of test station AN/ALM - 173
- Bench check/repair LRU-2 (RWR power supply)
- Bench check/repair LRU-6 (receiver, high band RWR)
- Bench check 039
- Bench check 081
- Bench check 041
- Bench check EAIC
- Bench check IMU
- Bench check/repair of ICCP
- Bench check/repair of radar transmitter
- Troubleshoot/repair microwave switching unit
- Bench check signal data processor
- Bench check radar receiver
- Bench check inertial measurement unit
- Bench check radar target data processor
- Bench check low voltage power supply
- Bench check air-to-air interrogator

DAFSC - 426

- P.E. Inspection 3000E
- P.E. Inspection 4000A
- Wheel bearing lube
- P.E. Inspection 4000

DAFSC - 427

- Flush/non-flush repairs
- Raydome repair
- Fabricate from plans
- Fabricate tubing
- Remove/replace nut plates
- Remove/replace rivets
- Operate squaring shear
- Inspect incoming parts/determine repair process
- Repair jet engine components using T.I.C. welding
- Repair AGE/associated equipment

OVER---

- Build/maintain engine/AGE equipment
- Maintain shop file and records
- Inspect/repack LPU3P
- Inspect/repack LRU16P
- Sew/repair flight suits
- Inspect/repack Acrs.II parachutes
- Inspect/repair ant. exposure suits
- Remove/replace hydraulic utility bracket
- Repair rudder enclosure panels
- Remove screws/remove/replace studs, brushings, pins. Drill safety wire holes, install heli-coils/screw inserts

C. EQUIPMENT MAINTENANCE SQUADRON

DAFSC - 316

- Assembly of AIM-7F Missile
- Aim 9 and 7 Assembly
- Daily recharging unit
- Daily MCIA Compressor
- 9 AIM Build-up
- Supervise AIM-9 build-up
- Daily DSQ-29 Test set

DAFSC - 423

- Seat removal and installation
- Periodic inspections on all powered AGE, hose changes/wheel bearing packs: prepare units for paint

DAFSC - 427

- Paint AGE - prepare/paint aircraft
- Conduct OJT, inspect ACFT wash

DAFSC - 431

- Install windshield
- Remove nose landing gear
- Remove longitudinal feel trim actuator
- Install lateral feel trim actuator
- OPS check pitch ratio changer
- Rig/check canopy
- OPS check lateral flight control
- Assemble tire wheel assembly
- Inspect wheel bearings
- OPS check landing gear system
- Inspect/Lub work Area I, LA, 2,3,4,5,6,7,8,9, 10,11, and 12.
- Remove canopy
- Rig throttle cable
- Load tow dart
- Assemble and balance tow target

DAFSC - 461

- Process 20 mm ammunition

DAFSC - 462

- Manage tool crib, PMEL etc.
- Training NCO
- Bench stock/mobility NCO
- Dispatcher/scheduler
- Maintenance crew chief
- LAU-114 Inspection/Repair
- Gun inspection
- Acceptance of pylon

ATE
LMED
8