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ASSESSMENTS OF ADVANCED DEVELOPMENT TECHNOLOGY PROGRAMS: A STUDY TO DETERMINE THE PERCEIVED EFFECTIVENESS OF A NEW AIR FORCE SYSTEMS COMMAND POLICY

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THESIS

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of the Air Force Institute of Technology
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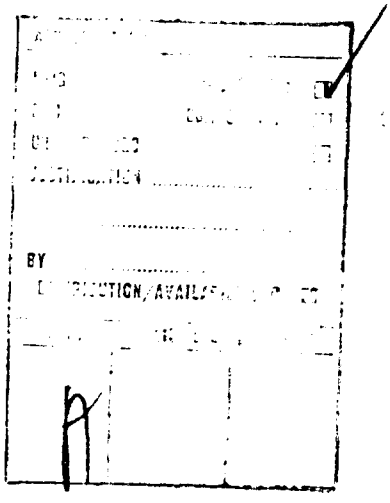

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September 1976

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Preface

I feel that the Air Force faces a great challenge in developing advanced technology weapons within the environment established by today's national priorities. As the resources for military research and development decline, we must make every effort to insure that maximum use is made of the technological advances achieved by the research and development community of this country. The assessment of advanced development technology programs is an action taken in an attempt to enhance the use of these technological advances. The effectiveness of this policy is therefore of great interest to me. I found the subject of technology transfer, and thus the effectiveness of the assessment process, to be highly complex. I therefore concentrated on six major issues in my research. Hopefully, these issues are of interest to those who are involved with executing the assessment policy. It is also hoped that the results of my research may, in some small way, be of use either in executing the current policy or formulating new and revised policies.

Appreciation and thanks must be extended to several people who aided me with their time and efforts. First, Major Charles W. McNichols, my thesis advisor, contributed significantly to this study in many ways. His expertise in research methods and his insight and encouragement were particularly valuable to me. I also thank my reader, Lt Col T. Roger Manley, for his assistance; in particular his assistance in formulating the interview questions. I am particularly indebited to the product division and laboratory personnel who assisted me with their reviews and comments on the preliminary interview questions and draft chapters of the thesis. I have chosen not to name these individuals in order to preserve the identity of the product division and laboratories studied. I wish

also to thank Lt Col Jim Eri, HQ AFSC, who on several occasions took time to assist me in this study.

I express my greatest thanks to Jo Ann, my wife, and Kelli and Brian, my children for their understanding and encouragement through the thesis. Thanks also goes to Jo Ann not only for conscientious typing of the thesis but for her assistance in performing many of the statistical computations.

Capt Richard L. Robinson

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Abstract

Recent studies conducted by the United States Air Force concluded that closer ties should be established between the laboratories and product divisions of the Air Force Systems Command. Toward this end, the Air Force Systems Command has established a policy whereby the product divisions will assess advanced development technology programs conducted by the laboratories. This research effort is a study to determine the perceived effectiveness of this assessment policy. Thirty-eight structured interviews were held with laboratory and product division personnel. The perceived effect of the assessment policy on technology transfer, communication, and dialogue, and the perceived significance of several barriers to technology transfer were discussed during these interviews. Other issues discussed were the ease or difficulty of accomplishing key assessment tasks, the responsiveness of laboratories to product divisions, the attitude of laboratory and product division personnel with respect to the assessment policy, and the desirability of encorporating additional technology transfer mechanisms. The writer concluded that those interviewed perceived that the assessment policy will tend to enhance technology transfer, communication, and dialogue. Also, no significant problems were perceived to exist in accomplishing the assessment tasks. Generally, those interviewed perceived that the laboratories will not tend to be more responsive than they should be. A favorable attitude toward the assessment policy was expressed, but the additional technology transfer mechanisms were not strongly endorsed.

ASSESSMENTS OF ADVANCED DEVELOPMENT TECHNOLOGY PROGRAMS: A STUDY TO DETERMINE THE PERCEIVED EFFECTIVENESS OF A NEW AIR FORCE SYSTEMS COMMAND POLICY

I. Introduction

> In order to maintain our most flexible and imaginative defense posture, the Department of Defense (DOD) must utilize every conceivable resource, capability and contribution it can possibly motivate, attract or support. This requires the competence and contribution of all types of institutions--industry, university, nonprofit, and in-house organization. . . . Each is an important interrelated, synergetic subsystem whose products of new knowledge, designs, and weaponry are the first-line technological defense against foreseeable threats Glass, 1967:1).

The above statement succinctly characterizes the challenge that the Department of Defense (DOD) faces in maintaining a strong defense posture based upon advanced technology weaponry. It is somewhat axiomatic that success in meeting this challenge is heavily dependent upon the advances in science and technology that are made through the research and development (R&D) programs conducted by the three military departments. However, technical advances alone are not sufficient. The "products" of the "subsystems" mentioned in the opening quote must be effectively transferred to and intergrated with an end-using weapon system in order to achieve the desired defense posture.

Background

During the past fifteen years there has been much high level

attention paid to the effectiveness of one institutional element of the military R&D community--the Defense in-house laboratories. A persistent feeling expounded by many prominent committees and individuals is that ". . . in-house laboratories are the weakest and least effective of the performers available to do RDT&E for the Department of Defense" (Glass, 1967:11).

The most recent review of the in-house laboratories was accomplished in 1974 by a joint Office of the Secretary of Defense (OSD)/Military Department undertaking. This effort has become known as the Laboratory Utilization Study (LUS) and was concerned with answering questions regarding the need, size, and use of the in-house laboratories. Changes to the management structure and organization of both the laboratories and the respective headquarters which would improve the contributions to the Department of Defense (DOD) were also considered (U. S. Congress, 1975: 400-402).

Air Force Laboratory Utilization Study Findings. The Air Force participation in the joint study was in the form of a study group chaired by Maj Gen Kenneth R. Chapman. The official conclusions and recommendations reached by this study group have not been widely disseminated in a final report. However, the key findings and recommendations of the Air Force study group are highlighted in a summary report issued by the Department of Defense (Allen, 1975).

The information contained in the Department of Defense (DOD) report indicates that, overall, the Air Force laboratories were given a very positive assessment with respect to competency of personnel, responsiveness to requests for support, and quality of work. The laboratories were also judged to be at least as good as non-Air Force organizations engaged in

similar work (Allen, 1975:24). These conclusions were based on the results of a survey conducted in mid-June 1974 by faculty members of the Department of Systems Management, Air Force Institute of Technology (AFIT). Survey questionnaires were distributed Air Force-wide to personnel working in the system development agencies. The questionnaires were designed specifically to measure the laboratory user's evaluation/perceptions of the Air Force laboratories (Manley, 1974:1).

Although the Air Force laboratories were generally viewed in a favorable light by the system development community, some negative observations were also made. Almost half of the survey respondents suggested ways in which the effectiveness of the Air Force laboratories could be improved. Their suggestions revealed four general areas of concern: (1) an inadequate Air Force program for transitioning laboratory developed technology to the program offices, (2) inadequate communication between the laboratories and the program offices, (3) inadequate congruency of laboratory and program office goals, and (4) inadequate visibility of laboratory projects in the system development area (Manley, 1974:1, 2).

The Air Force study group itself also suggested ways to increase laboratory effectiveness. Generalizing, the study group's suggestions required the following actions:

1. Continued use of the laboratories to train military officers in the research and development career field.
2. The use of fiscal controls over civilian manpower rather than manpower ceilings.
3. Adjustments of super grade civilian positions within AFSC, more term appointments for senior civilians, and a career development plan for civilian employees.
4. A re-examination of the missions of the in-house laboratories.
5. Forcing closer ties between the AFSC laboratories and the AFSC product divisions (Allen, 1975:26).

In order to achieve closer ties between the laboratories and product divisions the study group suggested a realignment of some of the laboratories and recommended that the product divisions control the advanced and engineering development funds expended by the laboratories.

> The study group suggested that some laboratories be affiliated with product divisions: AFATL remain with ADTC; AFAPL, AFFDL, AFAL, and parts of ARL combine into one new laboratory associated with ASD; a part of AFCRL (restructured), RADC and RML affiliate with ESD; and AFRPL with SAMSO. The long range objective is to create a center of technology behind each product division to insure Air Force technical competence in the key product areas of interest. The AFSC product divisions should control the advanced and engineering development funds expended in these laboratories, although the laboratories would continue to report to DS&T (Allen, 1975:26).

It was felt that product division control of advanced and engineering funds would ". . . improve relevancy of the projects, bring the laboratories closer to system planning and acquisition, and provide a direct link for the transition of technology" (Allen, 1975:25).

The survey respondent and study group suggestions identified above have resulted in the formulation of several new management policies by Headquarters Air Force Systems Command (HQ AFSC). One of these new policies requires that the product divisions assess advanced development technology programs (ADTP) conducted by the laboratories and other agencies. The ADTP assessment policy provides the basis for this research effort, and its implementation is discussed below in greater detail.

Implementation of Advanced Development Technology Program (ADTP) Assessments. One of the first indications that official action was being considered as a result of the Laboratory Utilization Study (LUS) was a Headquarters Air Force Systems Command (HQ AFSC) letter sent to subordinate units within the command on 29 January 1975. This letter was signed by Lt Gen John B. Hudson, then the Vice Commander of AFSC, and

indicated that an assessment process was being considered as a means of implementing a LUS recommendation to increase the responsiveness of the laboratories to the product divisions. The desired result of the assessment process proposed was to "improve the transition of technology" (HQ AFSC (CV) letter, 29 Jan 1975:Par 1). The letter also indicated that the information collected by the assessments would be used to establish an AFSC position on those advanced and engineering development efforts that should be pursued. The specific assessment process outlined in that letter is as follows:

> . . . It is envisioned that the Laboratories will annually submit 6.3/6.4 program documentation to AFSC through the appropriate Product Division(s). The Product Division will add an assessment of relevance, cost implications, timeliness, payoff, and relative priority of proposed efforts, both new starts and continuing programs (HQ AFSC (CV) letter, 29 Jan 1975: Par 2).

The letter was not directive in nature but was replete with qualifiers indicating that the overall process for conducting the assessments was not firm. Suggestions for the actual implementation were solicited from the various laboratories and product divisions.

Considerable interaction between HQ AFSC, the product divisions, and the laboratories followed Gen Hudson's letter. "Brainstorming" sessions were held, test case assessments were completed, and a "quick response" prioritization of advanced development efforts by all of the product divisions was forwarded to HQ AFSC. The experience gained from these activities lead to the development of a definitive set of procedures for the assessment process. The procedures and the requirement to implement the assessment process were officially promulgated by the new Vice Commander of AFSC, Lt Gen Robert T. Marsh, on 5 December 1975 (HQ AFSC (CV) letter, 5 Dec 1975). These procedures have subsequently been published

as AFSCR 80-19. This document as well as Gen Hudson's and Gen Marsh's letters are reproduced in Appendix B for the convenience of the reader.

The ADTP assessment process clearly represents management action taken to alleviate problems regarding inadequate responsiveness of the laboratories to the product divisions, inadequate dialogue between the laboratories and product divisions, and inadequate transfer of technology. These factors had been perceived as problem areas by Air Force management prior to the Laboratory Utilization Study (LUS), and management action was also taken at that time.

Previous Management Action. In 1971 the Air Force submitted a plan of action to the Task Group on In-house Laboratories, and this plan contained several management improvement actions that had either been completed or were under consideration at that point in time (ODDR&E, 1971:57-115).

One of these management improvement actions was the conversion of the Research and Technology Division (RTD) to the Director of Laboratories (DOL) organization in November 1966. The Air Force felt that this conversion would provide the following benefits:

> a. Increased relevance of laboratory work to system development and operational requirements.
> b. Improved participation of laboratories in system planning and concept formulation.
> c. Greater laboratory responsiveness to system development needs and technical solution of operational problems . . . (ODDR&E, 1971:79).

These expected benefits clearly indicate that prior to establishing the Director of Laboratories organization inadequate relevance of laboratory work, inadequate laboratory participation in system planning, and inadequate laboratory responsiveness to system development needs had been perceived as problem areas by Air Force management.

Another action mentioned was the establishment of coupling procedures. The Technology Need program, established in 1968, was cited as providing the procedures for technology coupling (ODDR&E, 1971:109). Additionally, the Air Force indicated that procedures for obtaining laboratory direct support were documented in existing HQ AFSC Regulations. Two of the benefits expected to be received from these procedures were increased dialogue between the laboratories and the product divisions and more face to face interaction (ODDR&E, 1971:109). These expected benefits clearly indicate that, prior to establishing the above procedures, inadequate coupling of technology and inadequate dialogue between the laboratories and product divisions had also been perceived as problem areas by Air Force management.

Statement of the Problem

The fact that the previous management actions enumerated above addressed the same problem areas that the ADTP assessment process addresses is clear. It is felt that the persistence of these problem areas demonstrates the difficulty encountered in achieving a desired solution. Thus, the logical question becomes, "How effective will the ADTP assessment process be in alleviating these difficult problem areas?"

The problem perceived by the researcher was to obtain some measure of the true effectiveness of the ADTP assessment process. This proved to be impossible because the process had just been implemented and data which could be used to explicitly measure success or failure did not exist. Thus, as a surrogate of true effectiveness, it was decided to attempt to measure the perceived effectiveness of the process by obtaining feedback from laboratory and product division personnel who have been involved in implementing and executing the assessment policy.

Scope and Limitations

Currently, there are both proponents and opponents of the ADTP assessment process. The objective of this thesis does not include a conclusion as to whether this process is either good or bad. Rather this study centers on determining the perceived effectiveness of the process with respect to alleviating the problem areas identified above. The study addresses the following specific issues:

1. What is the perceived effect of the ADTP assessment process on the transfer of technology?
2. What is the perceived effect of the ADTP assessment process on communication and dialogue?
3. What is the relative ease or difficulty of accomplishing key tasks required by the assessment process?
4. Will the laboratories be as responsive to the product divisions as they should be?
5. What is the general attitude of product division and laboratory personnel with respect to the assessment process?
6. Do additional technology transfer mechanisms formulated by the researcher have enough merit to warrant further consideration?

Ideally a study of this nature would consider all product divisions and all laboratories, but the effort required for such a comprehensive study far exceeded the time available for work on the thesis. Consequently, the study was purposefully limited to one product division and three related laboratories. This limitation in scope dictates the use of caution when extrapolating the conclusions and findings of the study to all product divisions and laboratories.

A final limitation on this research effort is the source of data. A great deal of information was gathered through personal interviews and letters. Since a promise of anonymity was paramount in securing some of this information, neither the product division nor laboratories visited will be identified.

Assumptions

One of the underlying assumptions required by this research effort is that the personnel interviewed truthfully expressed their attitude and opinions in responding to the questions asked since their anonymity was assured. The researcher perceived this to be in fact true, and it is felt that a review of the subjective comments listed in Appendix E will support the validity of this assumption.

Other assumptions required for the study are those imposed by the statistical tests used during the analysis of the data. These include the assumptions that the interviews conducted represent a random sample and that responses obtained from those interviewed are independent. The validity of these assumptions is discussed in the chapter on research methodology (Chapter III).

Objectives

The specific objectives of this study are:

1. To provide empirical evidence which characterizes the perceived effectiveness of the AFTP assessment process.
2. Determine if the effectiveness of the assessment process perceived by the various individuals interviewed is dependent upon demographic variables, such as the individual's organization, grade, time of service in the field of research and development, or time in the present job assignment.
3. Identify problem areas which may be encountered in executing the assessment process and recommend possible solutions.
4. Determine the general attitudes of personnel working in the product divisions and laboratories with respect to the assessment process.
5. Explore the desirability of incorporating additional technology transfer mechanisms, such as laboratory/product division rating schemes, making future funding contingent upon past transfers of technology, and the creation of a technology transfer agency.

The ultimate goal of the research effort is to determine the

effectiveness of the ADTP assessment policy as perceived by those laboratory and product division personnel who are charged with its implementation and execution. It is hoped that findings in the areas investigated may be of some value to Air Force management personnel in terms of either formulating revised policies or in effectively administering existing ones.

Conduct of the Research (Overview)

This research effort consisted of four phases of activity: formulating a schedule of interview questions, conducting formal interviews with personnel responsible for executing the assessment policy, reducing and analyzing the data collected during the interviews, and synthesizing conclusions and recommendations. The schedule of interview questions was developed through a process of question formulation and review. Information obtained through an extensive search of relevant literature and comments received from key personnel assigned to HQ AFSC, one product division, and two laboratories were used to formulate the final set of interview questions. This final set of interview questions is shown in Appendix C, and a discussion of the individual questions can be found in the chapter on research methodology. The formal interviews were conducted during a three-week period from 29 April 1976 to 20 May 1976. In all, thirty-eight people were interviewed. These personnel were assigned to the product division, the laboratories, HQ AFSC, and an operational command liaison office. Both subjective comments and answers to the specific questions were obtained from those interviewed. The selection of the personnel interviewed is discussed in the chapter on research methodology. The responses to the interview questions are summarized in Appendix D,

and selected excerpts from the subjective comments received during the interviews are listed in Appendix E.

The analysis of the data collected during the interviews is structured to address the specific issues enumerated above in "Scope and Limitations" and to achieve the specific research objectives. Both the results obtained through the application of several analytical techniques to the interview data and the subjective comments received during the interviews were considered in formulating the final conclusions. The specific details of the analysis are presented in Chapter IV, and conclusions and recommendations are presented in Chapter V.

Chapter Summary

Much high level attention has been directed toward the effectiveness of the Defense in-house laboratories. The most recent review of these agencies was accomplished in 1974 by a joint Office of the Secretary of Defense (OSD)/Military Department study known as the Laboratory Utilization Study (LUS). Several suggestions were made by the Air Force study group participating in the LUS, and one of these suggestions was to force closer ties between the AFSC product divisions and the AFSC laboratories. This suggestion for closer ties resulted in the formulation of a new management policy by HQ AFSC. The policy implemented requires the product divisions to assess advanced development technology programs (ADTP) conducted by the laboratories and other agencies.

Previous to the LUS, the Air Force had taken management action designed to alleviate problem areas similar to those perceived by the LUS group: inadequate relevancy of laboratory programs, inadequate dialogue between the laboratories and the product divisions, and inadequate transfer of technology to system application. The persistence of these

problems characterizes the difficulty associated with achieving a desired solution. Thus, the researcher decided to attempt to measure the perceived effectiveness of the ADTP assessment process with respect to alleviating these difficult problems.

The problem of measuring the perceived effectiveness is addressed through the conduct of structured interviews with personnel responsible for executing the policy. In all, thirty-eight personnel were interviewed. Chapter II follows and is an overview of several concepts related to the research problem.

II. Overview of Key Concepts

This chapter is an overview of several key concepts which are related to the research problem: the structure of the research and development (R&D) program of the Air Force, the scope of product division and laboratory efforts, the assessment of advanced development technology programs, and related research on the transfer of technology.

R&D Program Structure

The research and development (R&D) program of the Air Force is divided into five categories: research, exploratory development, advanced development, engineering development, and management and support. These categories of activity are differentiated by a consideration of the level of technical knowledge existing in the field of investigation, the scope and thrust of the research and development effort, and the means of program control and funding. Moreover, each R&D category is subdivided into program elements. A program element may contain a number of projects in a related field, or it may represent a single major project. Funds are generally allocated at the program element level (AFR 80-1, 1970:2).

Each program element is assigned a six-digit number based on the DOD programming and budgeting system. The structure of this program element number is shown in Figure 1. The first digit represents the DOD major force program. The second digit corresponds to the category of activity within that DOD program. The remaining three digits, in combination, identify a specific program element or project (AFR 80-1, 1970:5; OOC, 1975:22-28). Often the first two digits of the program element number are used synonymously with the R&D categories. In such cases 6.1 corresponds to "research," 6.2 corresponds to "exploratory development," and so on.

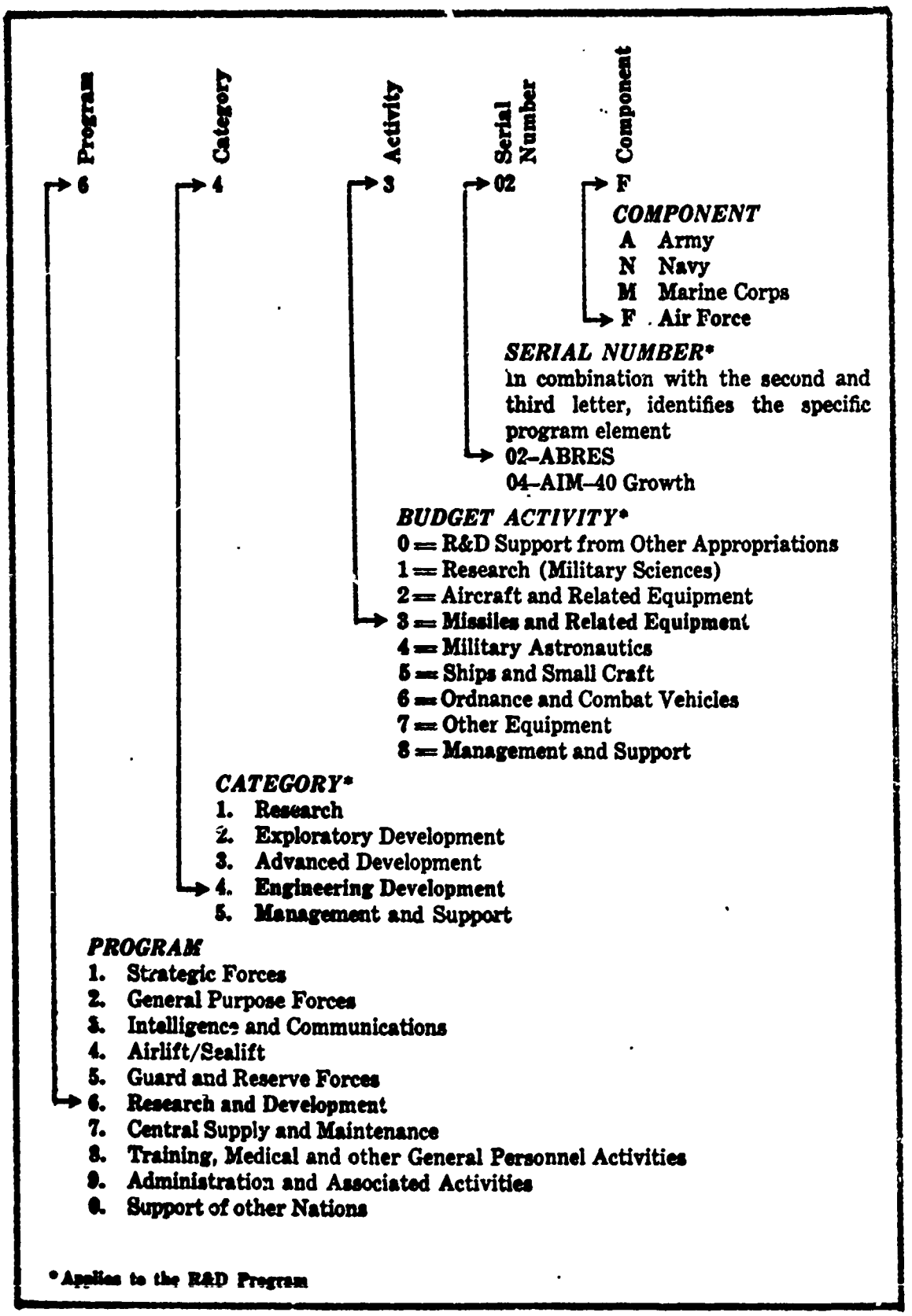


Figure 1. Program Element Number Structure (AFR 80-1, 1970:5)

Research. This program category represents the genesis of the research and development cycle. The activities conducted within this category are directed towards increasing fundamental knowledge and understanding in the fields of science related to national security needs. This knowledge and understanding contributes to the technology base required for subsequent exploratory and advanced development efforts, but the solution to a specific military problem is generally not identified (AFR 80-1, 1970:2). Policy guidance for research efforts is provided by HQ USAF, and the Director of Science and Technology, HQ AFSC (DL), is responsible for allocating the funds to specific program elements (AFSCR 23-1, 1975:4-60).

Exploratory Development. Unlike research, exploratory development activities are directed toward the solution of a specific military problem. They are designed to provide proof of the technical feasibility of a new concept in terms of a military application and to reduce the risk associated with further development if the new idea appears promising. Generally, only one new technology is addressed by a specific program or project.

Policy guidance on exploratory development efforts are provided by HQ USAF, and the Director of Science and Technology, HQ AFSC (DL), is responsible for allocating funds to specific program elements (AFSCR 23-1, 1975:4-60). Normally, financial control is exercised by level of effort funding since this provides flexibility to the laboratory director in allocating resources (AFR 80-1, 1970:2).

Advanced Development. One distinguishing feature of an advanced development effort is the development of hardware for experimentation or test rather than actual service use. In theory, advanced development programs are used to prove either a new subsystem or technology before these

new items are used in an actual weapon system (AFSCR 27-6, 1974:5-20). The intent is to build a confidence level sufficient to warrant further development of the new capability if the requirement and funds remain available.

Advanced development programs (ADPs) generally require a greater expendature of R&D resources than either research or exploratory development efforts. Thus the allocation of funds to specific program elements is made by HQ USAF rather than the Director of Science and Technology. Also, monitor and control of advanced development efforts are accomplished on a project by project basis rather than by the level of effort basis commonly used for research and exploratory development (AFR 80-1, 1970:2).

Engineering Development. A program is classified in the engineering development category if the item being developed is intended for actual service use (AFR 80-1, 1970:2). These activities occur near the end of the research and development cycle. At this point in time the technological unknowns have been virtually eliminated, and the primary effort is directed to the system engineering and testing required to convert the knowledge and equipment gained from the earlier phases of R&D into a new weapon system. Engineering development program elements are subdivided into projects, and the programming and budgeting activities are accomplished at the project level by HQ USAF (AFSCR 27-6, 1974:5-21).

Management and Support. This category of research and development contains program elements for engineering support from several Federal Contract Research Centers (FCRC), such as MITRE, RAND, and the Aerospace Corporation. Program elements which provide for the operating cost of AFSC-operated facilities and test ranges are also included (AFSCR 27-6, 1974:5-21).

Scope of Product Division and Laboratory Efforts

The product divisions and laboratories are responsible for different activities. Typically, the product divisions are responsible for the later categories of R&D effort, and the laboratories are responsible for the earlier phases. A brief review of the scope of these efforts will provide information supportive to the discussion of the technology transfer concepts presented later. Table I lists the agencies considered as product divisions and laboratories during the course of this research effort. However, it should be noted that personnel from only one product division and three laboratories were actually interviewed during the conduct of this research effort.

Product Division. The product divisions are officially recognized as AFSC field commands. The precursors to the agencies existing today were formed through several organizations and reorganizations of the Air Force R&D elements during the time period between November 1959 and the establishment of the Air Force Systems Command (AFSC) in April 1961 (NSF 62-37, 1963:255).

The scope of the product division effort is very broad in that they are responsible for the management of the acquisition of new weapon systems. A discussion of this system acquisition process is well beyond the intended scope of these overview remarks. Rather the intent is to provide an indication of the categories of R&D activity that the product divisions typically conduct. The reader interested in the management of the acquisition process is referred to AFSCP 800-3.

Any generalization of the R&D activities conducted by product divisions is doomed to be in error because the system acquisition and R&D processes are highly interwoven and complex. However, it can be

TABLE I

LABORATORIES AND PRODUCT DIVISIONS

OF AFSC

LABORATORIES	PRODUCT DIVISIONS
Aerospace Medical Division (AMD)	Aeronautical Systems Division (ASD)
Air Force Armament Laboratory (AFATL)	Armament Development and Test Center (ADTC)
Air Force Geophysics Laboratory (AFGL)	Electronic Systems Division (ESD)
Air Force Human Resources Laboratory (AFHRL)	Space and Missle Systems Organization (SAMSO)
Air Force Rocket Propulsion Laboratory (AFRPL)	
Air Force Weapons Laboratory (AFWL)	
Air Force Wright Aeronautical Laboratories (AFWAL)	
Air Force Avionics Laboratory (AFAL)	
Air Force Aero-Propulsion Laboratory (AFAPL)	
Air Force Flight Dynamics Laboratory (AFFDL)	
Air Force Materials Laboratory (AFML)	
Rome Air Development Center (RADC)	

(AFSCR 80-19, 1976:Par 2; "A Guide," 1976:154-155)

stated with some degree of accuracy that the product divisions primarily conduct R&D efforts in the engineering development category. These efforts are associated with validation and full scale development phases of weapon system acquisition, and examples include the development of items such as the B-1 and F-16 prototype aircraft. System related advanced development efforts are also conducted, but the magnitude of these efforts is considerably less than that of the engineering development activities. The product divisions rely almost exclusively on industry contractors to accomplish the actual development work (AFSCP 800-3, 1976).

Laboratory. The laboratories are responsible for two broad classes of effort: development of the technology base and support to other Air Force agencies. The laboratories support the technology base by serving as an Air Force interface with the technological community and by conducting research, exploratory development, and advanced development programs. Support to other agencies is generally provided in the form of technical assistance. This includes assistance in solving technical problems encountered during weapon system acquisition by the product divisions and in the operational environment by the operational commands. The laboratories also support higher headquarters by providing technical information for long range military planning and decision making (AFR 80-3, 1971:2).

The bulk of the laboratory effort is devoted to supporting the technology base. Approximately half of the funds available to the laboratories come from the research (6.1) and exploratory development (6.2) budget categories, mostly the latter. About 35% of the funds comes from the other RDT&E budget categories, primarily advanced development (6.3), and the remaining 15% comes from non-RDT&E budget categories. This latter

source of funding represents the amount of effort devoted to the support of existing weapon systems and other activities (Allen, 1975:3).

The laboratories rely on industry contractors for the conduct of much of the actual development work. Only 30% of the research and exploratory development efforts and only 5% of the total RDT&E effort are actually performed in-house (Allen, 1975:3).

Assessments of Advanced Development Technology Programs

The background and implementation of the ADTP assessment requirement was presented in the introductory remarks of Chapter I. Moreover, the scope, anticipated benefits, and a detailed specification for the assessment paper are described in the implementing regulation, AFSCR 80-19 (see Appendix B). The ensuing discussion is a summary of the assessment process for new and continuing programs and a brief overview of the relationship of the assessments to the formulation of an AFSC advocacy position regarding the conduct of research and development programs within the laboratories.

However, before the discussion proceeds, the source of the information presented requires clarification. The only official sources of information available were Gen Marsh's 5 December letter and AFSCR 80-19 (see Appendix B). The remaining information was obtained through informal interviews with personnel working within HQ AFSC, the product division, and the laboratories, as well as from briefing charts provided by these individuals. In fact, except for format, the figures presented are duplicates of briefing charts obtained during the visit to HQ AFSC.

Assessment of New and Continuing Programs. An overview of the ADTP assessment process and subsequent program direction is shown for new

new programs in Figure 2 and continuing programs in Figure 3. A comparison of these two illustrations reveals that the salient features of the assessment process for these two types of programs are similar. The laboratories, in responding to official guidance, prepare documentation which is concurrently forwarded to HQ AFSC (DL) and the appropriate product divisions. The product divisions forward completed assessments to HQ AFSC (XR). After coordination within HQ AFSC, an advocacy position is presented to the Air Staff.

Program direction for authorized programs is provided from HQ USAF to HQ AFSC in the Program Management Directive (PMD). HQ AFSC (DL), in turn, provides program direction to the appropriate laboratories through the use of an AFSC Form 56.

The primary differences in the application of the assessment policy between the new programs and continuing programs is in the details of the planning documentation prepared by the laboratories, the depth of the assessments prepared by the product divisions, and the timing. At the time of this writing the official position regarding the details of the information required in the proposed development plan, referred to as a Technology Program Plan (TPP) in AFSCR 80-19, is being coordinated within HQ AFSC (HQ AFSC (DLX) letter, 21 April 1976). Conceptually, however, it will contain sufficient information for the product divisions to perform the required initial in-depth assessment with respect to payoff, relevance, cost implications, timeliness, and relative priority. More detail on the specific information required in the initial in-depth assessment paper is contained in Attachment 1 to AFSCR 80-19 (see Appendix B).

The assessment of current programs is an annual requirement. The laboratories provide updated planning documents and planning summaries to

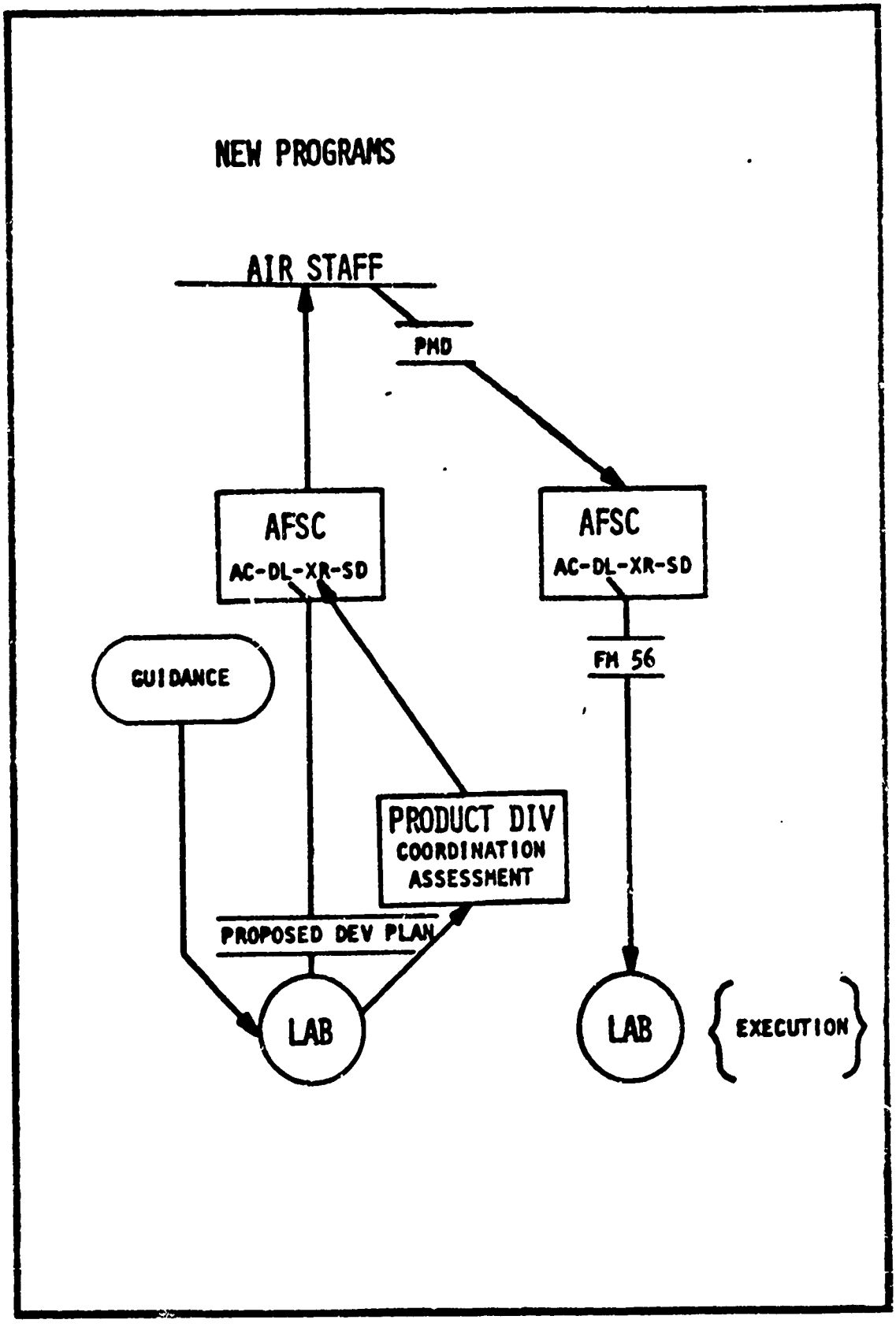


Figure 2. ADTP Assessment Process and Program Direction for New Programs (HQ AFSC Chart, See Text)

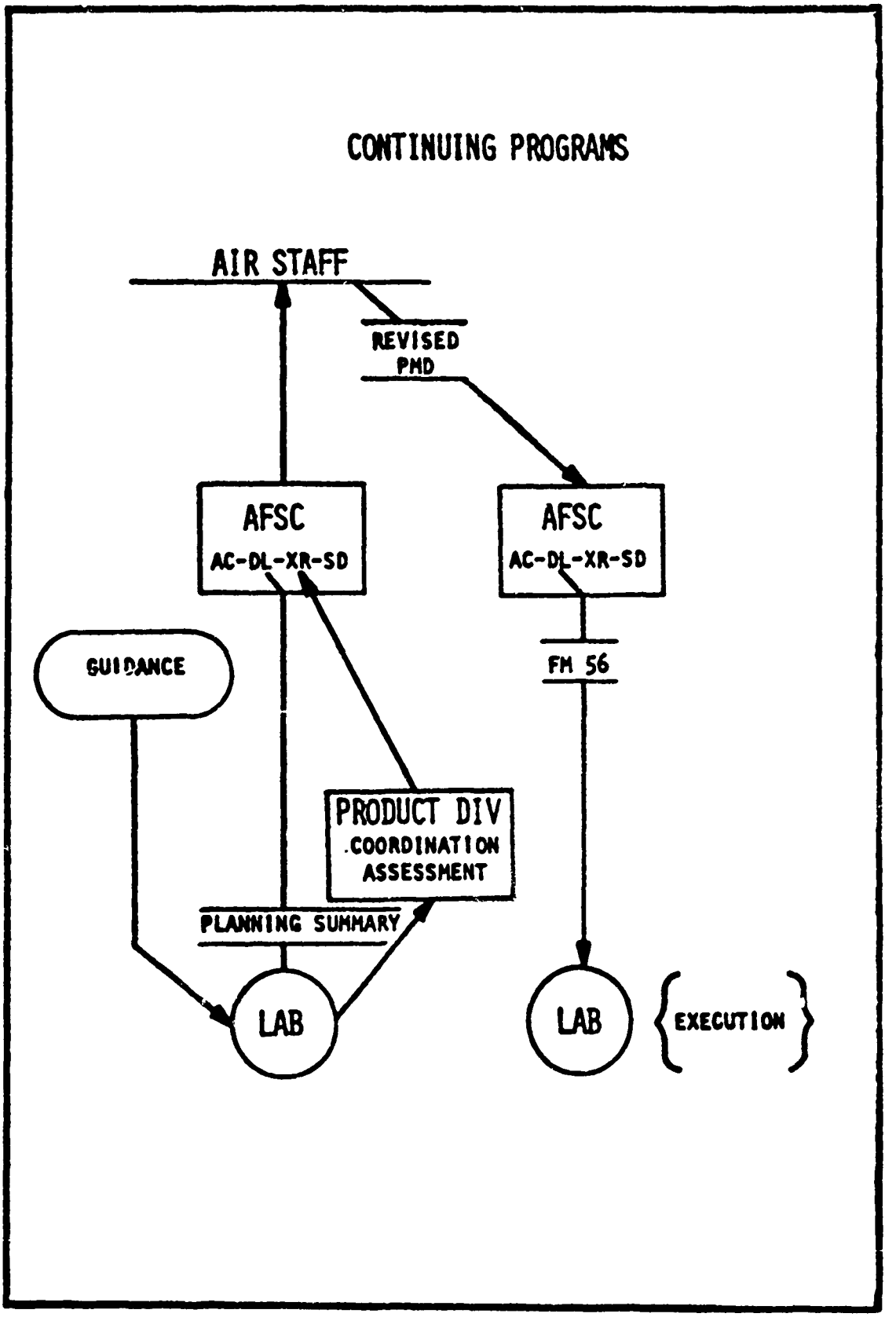


Figure 3. ADTP Assessment Process and Program Direction for Continuing Programs (HQ AFSC Chart, See Text)

HQ AFSC (DL) and the appropriate product divisions. The product divisions either confirm or modify the previous assessments and the relative priority assigned and provide this information to HQ AFSC (XR). The specific information required in these annual assessments is contained in Attachment 2 to AFSCR 80-19 (see Appendix B).

Program direction for programs authorized to continue is essentially the same as that of new programs. The noticeable difference is the use of revised program direction documentation in lieu of new documentation.

Support for the AFSC Advocacy Position. Within the last two years new ideas and procedures have been implemented in order to assist in the development of an HQ AFSC advocacy position regarding which research, exploratory development, and advanced development program should be pursued. The assessment of ADTPs and the formulation of an AFSC investment strategy (Status Report, March 1976) are two of these new ideas. The key aspects of the process followed in developing the advocacy position for the fiscal year (FY) 1978 and the fiscal year (FY) 1979 programs are shown in Figure 4.

The formulation of the advocacy position began in November 1975 with the establishment of development goals by the Deputy Chief of Staff for Development Plans, HQ AFSC (XR). The assessment activity identified in the subsequent two blocks shown in Figure 4 was devoted to current programs and projects (FY 1978/FY 1979). AFSC (XR) concentrated on advanced development technology programs (6.3), and the Director of Science and Technology, HQ AFSC (DL), concentrated on exploratory development programs (6.2).

The primary function of the Joint Planning Group (JPG) was to develop the proposed investment strategy. The group met during the January-February 1976 time period, and its membership was comprised of

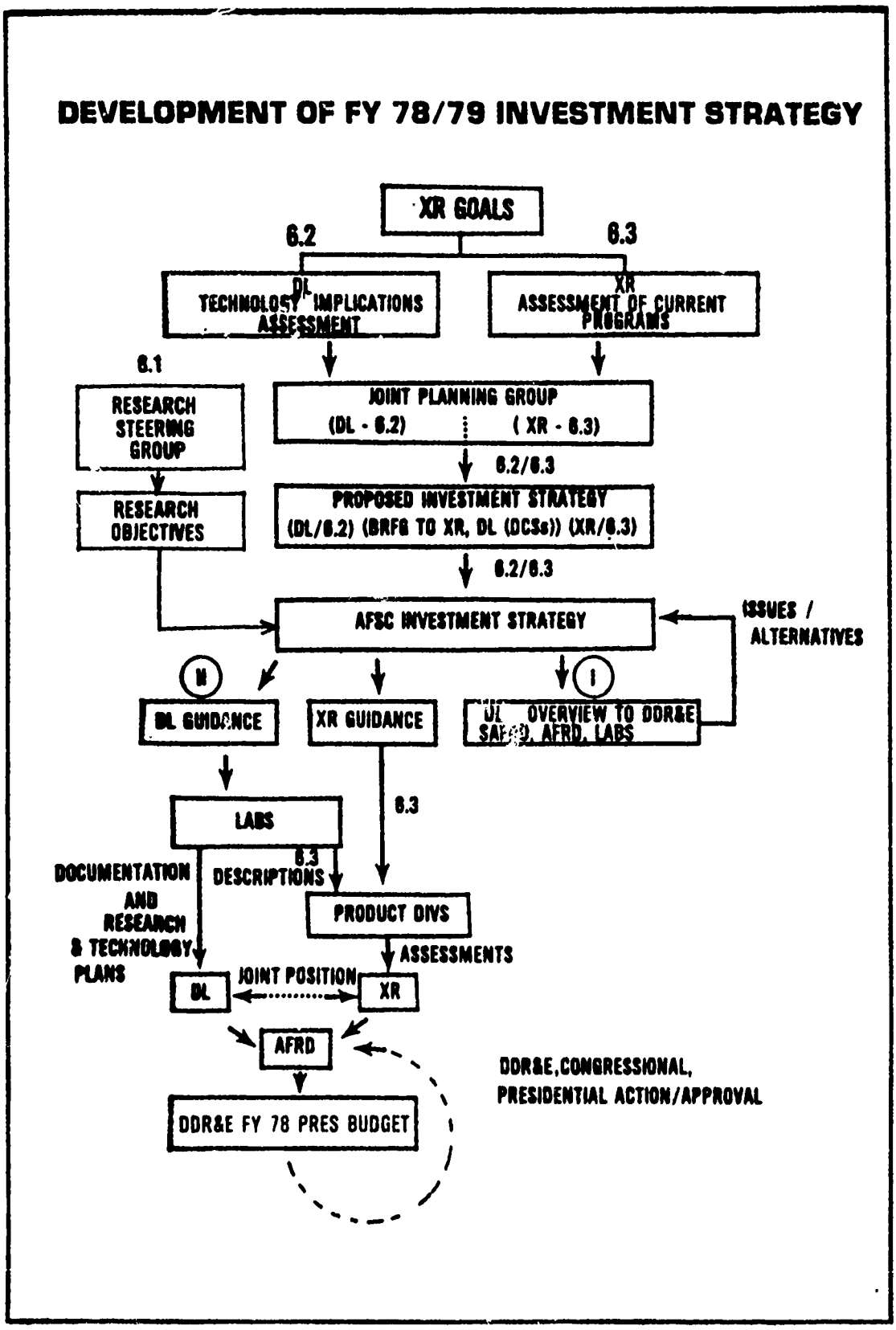


Figure 4. HQ AFSC Investment Strategy Cycle (HQ AFSC Chart, See Text)

personnel from AFSC (DL), AFSC (XR), and the laboratories and product divisions identified in Table I (Status Report, March 1976). The assessment papers prepared by the product divisions during the time period between June 1975 and January 1976 addressed programs to be conducted during FY 1977 and FY 1978. These assessments were available for consideration by the Joint Planning Group in developing the proposed investment strategy.

The initial formulation of the AFSC investment strategy was completed in February 1976. Final formulation, as shown in Figure 4, involved interaction with higher echelons of management within the Air Force and the Department of Defense to discuss, resolve, and incorporate various issues and alternatives.

Once finalized, the official investment strategy was used by AFSC (DL) and AFSC (XR) as an input to the development of planning guidance for laboratories and product divisions. The guidance provided the basis for formulating either new programs or revisions to current programs within the laboratories. The new advanced development technology programs proposed would be those scheduled to start in FY 1979.

The planning documentation for these programs will be forwarded to AFSC (DL) and the appropriate product divisions by December 1976. These programs will be assessed by the product divisions as discussed earlier. Once the assessments are completed and forwarded to AFSC (XR), a joint AFSC (DL) and AFSC (XR) advocacy position will be formulated. This position will be used to support the budgeting activity for FY 1978, the planning, programming, and budgeting activities for FY 1979, and the development of goals for FY 1979. Once new development goals are formulated the cycle is repeated.

Related Research on the Transfer of Technology

Improving the transfer of technology is explicitly stated as one of the anticipated benefits of the ADTP assessment process. The literature search conducted as part of this research effort revealed that the subject of technology transfer has been studied by both governmental agencies and interested individuals. Moreover, many of these research efforts have identified specific factors which appear to either aid or represent a barrier to the transfer of technology.

Two studies which identified factors that appear to aid the transfer of technology were sponsored by govermental agencies. In 1969 the Department of Defense completed Project Hindsight. This project was designed to study research and technology advances that have been used in weapon systems (ODDR&E, 1969:135). Also, in 1974 the National Science Foundation (NSF) sponsored a study by the Syracuse University Research Corporation to investigate the transfer of technology from federal laboratories to commercial use (Teich, 1974).

The National Science Foundation has also sponsored studies to identify factors that appear to be barriers to the transfer of technology. Dr. Joseph Gartner and Dr. Charles S. Naiman synthesized the results from several of these studies and formulated a set of specific barriers (Gartner, 1976:23).

This research effort draws upon the results of all of the above studies. Several interview questions were developed by considering the various factors which were identified as either aids or barriers to the transfer of technology. Accordingly, the following discussion is an overview of the principal findings and observations of the above studies that were used in this research effort. The development of specific interview

questions is discussed more thoroughly in the chapter on research methodology.

Project Hindsight. This project was established by the Director of Defense Research and Engineering in June 1965 with the objective of conducting a comprehensive analysis of the impact of research and technology on a number of weapon systems (ODDR&E, 1969:135). The resulting analysis was indeed comprehensive. Twenty different weapon systems were reviewed, and 710 research and exploratory development events which had contributed to advancing the technology used in these weapon systems were investigated in detail.

One "strategy" pursued by the Project Hindsight researchers was to "determine significant management and other environmental factors, as seen by the research scientist or engineer, that appear to be commensurate with high utilization of research results" (ODDR&E, 1969:9). Several such factors were identified as principal findings by the Project Hindsight study team, and those which were useful in formulating interview questions are summarized below:

1. The most utilized new scientific information comes from programs organized in response to a recognized DOD problem (ODDR&E, 1969:40).

2. In over 85% of the technological events studied, the original recognition of the problem or need was made by the applications engineering group. However, the solution to the problem was found by the research group in 72% of these events (ODDR&E, 1969:47).

3. "The dominant communication path for the transfer of technological information has been informal, person to person contact" (ODDR&E, 1969:48).

4. "The engineer appears to rely heavily on unified scientific theory and tabulated scientific information published in engineering-data handbooks and text reference" (ODDR&E, 1969:41).

Syracuse University Research Corporation Study. This research effort encompassed eleven different case studies of the transfer of technology from federal laboratories to commercial uses. The technologies represented were varied in that the cases studied ranged from the "Argonne Artificial Kidney" to a "synchronous communications satellite" (Teich, 1974: 1974:v).

A conceptual model of technology transfer was formulated by the researchers. This model encorporated the assumption that three basic functions occur in the process of technology transfer:

> Innovation--the creation or the adaptation of the technology . . . ; manufacture--the production of the technology for sale . . . ; and utilization--the acceptance and employment of the technology (Teich, 1974:2).

It was also recognized that these three functions must be brought together, and a fourth function referred to as "brokerage" was assumed to accomplish the assemblage. The ultimate success of technology transfer was hypothesized to be dependent upon the development of early formal linkages between the agents responsible for accomplishing the above three basic functions (Teich, 1974:2).

The Syracuse group offered comments regarding key characteristics of the technology transfer process and made several observations regarding the nature of the linkages that appear to aid the transfer of technology. The opinions expressed by the Syracuse research group that were used to develop interview questions in support of this research effort are listed below:

> 1. In our analysis, we were struck by the fact that, in each case, the transfer seemed to follow a quite different path, and that the problems could not be viewed as falling into neat categories. . . .
>
> . . . it is questionable whether in any of our

> cases, the transfer could have said to have been planned in detail. . . . More aptly, most of those that have suceeded seemed to have done so by virtue of a set of institutional arrangements that allowed the participants to work out problems as they come along (Teich, 1974:37, 38).
>
> 2. In the most successful cases the emphasis was on solving a problem independent of a "setting-on-the-shelf" technology. . . . the emphasis was on solving a problem, not finding a problem which can be solved with existing technology (Teich, 1974:42).
>
> 3. In order for the capability-need matching to take place, for the dynamic equilibrium between "push" and "pull" to exist, an early informational linkage between the innovator and the needer is necessary (Teich, 1974:43).
>
> 4. . . . it appears that the establishment of a strong innovator-manufacturer linkage--strong enough so that the manufacturer becomes a co-innovator--is one of the keys to successful transfer of federal laboratory technology (Teich, 1974:49).
>
> 5. . . . the character of the innovator-manufacturer linkage is strongly affected by the level of maturity of the technology in question. Maturity means not simply the level of development of the technology, but the degree to which those involved in the innovation can see that the remaining technical and cost barriers are soluable and are therefore willing to take risk on the innovation (Teich, 1974:51).

The Syracuse group also made comments regarding the use of federal laboratories as sources of technology for private use and offered some recommendations for improving technology transfer. Some of these findings were considered in formulating additional technology transfer mechanisms that might be used within the Air Force. The principal ones considered are listed below:

> 1. . . . because of their very institutional nature, federal laboratories are less than ideal places from which to expect complete technology transfer to the private sector. The most basic problem is one of institutional motivation. Regardless of the missions . . . the overriding goal is organizational survival (Teich, 1974:58).

> 2. If funding for development of subsequent innovations were somehow contingent upon the completion of of technology transfer, the innovators might be more motivated to see their innovations through to completion, but there appears to be little connection between this aspect of past performance and ability to acquire new funds (Teich, 1974:59).
>
> 3. Our study suggests that the dominant mode of existing institutional relationship in technology transfer relies too much to the invisible hand of mutual organizational adjustment. . . .
>
> . . . what are needed are "champions"--or rather "advocates"--of technology transfer as a process. There are individuals that are not product-but-process-oriented. They are professionals in technology transfer. . . . They intervene at key points in the transfer process. . . . They structure organizational relations; they approach transfer with a strategic plan. . . . They invest money for necessary adaptive engineering. . . . They are willing to risk failure (Teich, 1974:62, 64).

Gartner and Naiman Effort. Writing in Research Management, Dr. Gartner and Dr. Naiman raised the issue that recent studies have uncovered many barriers to the rapid and effective transfer of technology. Drawing upon their own experience and other research efforts sponsored by the National Science Foundation (NAE, 1974; Michaels, 1973), the authors formulated several institutional factors which appear to impede the optimal rate of technology transfer.

The environment in which technology is transferred is conceived of as consisting of three systems: the General System, the Subsystems, and the Elements. The definition presented for these three systems is as follows:

> 1. The General System is the totality of a Federal, University, Private R&D Laboratory or a company.
>
> 2. The Subsystems are the department or division within a laboratory or company.
>
> 3. The Elements are the people in respective departments that may or would be directly involved in technology transfer and utilization (Gartner, 1976:22).

Technology transfer efforts can normally be initiated at any of the above levels. However, the authors indicated that barriers to technology transfer exist at each of these levels. The specific barriers identified are listed below:

Between the General Systems
1. No formal transfer policies
2. Cost barriers
3. Time horizon conflict
4. Infringement problems

Between Subsystems
1. Inertia barrier
2. Lack of an incentive structure
3. Cost barrier
4. Communication barrier
5. Time barrier
6. Geographic distance
7. Non-existent transfer management structure
8. Technology barrier

Between Elements
1. Lack of an incentive structure
2. High risk of being blamed for failure
3. Insecurity of retaining job if not successful
4. Mutual disrespect
5. Unique requirements of each subsystem
6. Updating of technology needs
7. Time barrier
8. Lack of transfer organization managers (Gartner, 1976:23)

Chapter Summary

This chapter is an overview of four separate concepts which are related to this research effort. The research and development (R&D) program of the Air Force is divided into five categories of activity: research, exploratory development, advanced development, engineering development, and management and support. These categories of activity are differentiated by a consideration of the level of technical knowledge existing in the field of investigation, the scope and thrust of the activity, and the means of program control and funding. Each category of activity is also

subdivided into program elements, and, generally, funds are allocated at the program element level.

The product divisions and laboratories are responsible for different activities. The scope of the product division efforts generally encompasses engineering development activities; however, some system related advanced development activities are also conducted. The laboratories are responsible for the development of the technology base and are required to provide assistance in solving technical problems to other Air Force agencies. The laboratories develop the technology base by conducting research, exploratory development, and advanced development efforts. Both the laboratories and the product divisions rely heavily on industry contractors for the conduct of the actual development work.

Much of the background and the details of the ADTP assessment process are present elsewhere in this thesis. The discussion presented in this chapter is an overview of the assessment process as it applies to new and continuing programs. This primary difference in the application of the process to these two categories of ADTPs is in the details of the planning documentation prepared by the laboratories, the required depth of the assessments prepared by the product divisions, and the timing of the assessments. An overview of the relationship of the ADTP assessments to the formulation of an AFSC advocacy position regarding which research, exploratory development, and advanced development programs should be pursued by the laboratories is also given.

The final topic presented in this chapter is an overview of the related research on the transfer of technology. Several studies have been conducted by governmental agencies and interested individuals on this subject, and many of these studies have identified factors which appear

to either aid or represent a barrier to the transfer of technology. This research effort draws upon the results of these prior studies in that many of the interview questions were developed by considering the above factors. Project Hindsight conducted by the Department of Defense, a study conducted by the Syracuse University Research Corporation, and the recent work of Dr. Joseph Gartner and Dr. Charles S. Naiman are reviewed. Chapter III follows, and it is a discussion of the research methodology.

III. Research Methodology

This study deals with the measurement of the perceived effectiveness of the advanced development technology program (ADTP) assessment process with respect to alleviating specific problem areas that were identified by a recent Air Force Laboratory Utilization Study (LUS) effort. This measurement is accomplished by obtaining feedback from personnel who have been involved in formulating, implementing, and executing the assessment policy. The methodology used during the course of the research effort consisted of four principal phases of activity: formulating a schedule of interview questions, scheduling and conducting interviews, reducing and analyzing the data collected during the interviews, and synthesizing conclusions and recommendations. The process of formulating the interview questions, the questions themselves, and the methodology for scheduling and conducting the interviews are discussed in detail in this chapter. An overview of the methods used in the reduction of the interview data is also provided. The analysis of the data and the synthesis of conclusions and recommendations are presented in Chapters IV and V respectively.

Interview Questions

Initial Considerations. One of the first items that had to be decided upon was the mechanism to be used in gathering information for the research effort. The goal of measuring the perceived effectiveness of the ADTP assessment process required that the views of personnel who were familiar with the assessment process be determined. This could be accomplished through either personal interviews or survey questionnaires. There are advantages and disadvantages to either approach, but ultimately a structured interview approach was chosen.

This structured interview technique was attractive because of its flexibility. The structured design allows for the collection of data which can be subjected to rigorous statistical test, but, at the same time, the interview format allows for verbal communication between the researcher and those interviewed. This verbal communication not only allows for collecting subjective comments which can be used to complement the structured data, but it also provides a means whereby ambiguities in the questions can be resolved. An opportunity to resolve ambiguities in the questions was considered highly desirable because of the unique nature of the questions. Also, it was anticipated that the number of trial interviews conducted in order to pretest the interview questions would be limited because of the time constraints placed on the thesis effort.

The most serious shortcoming of the structured interview approach is that only a small number of personnel can be contacted. The fact that three weeks of active interviewing were required in order to complete the thirty-eight interviews conducted for this research effort is indicative of the time required to schedule and conduct these interviews.

Formulation and Review Process. The schedule of interview questions was developed through a process of question formulation and review. The entire process required approximately six weeks to complete. Initially, the official correspondence which established the assessment process and the appropriate Air Force and Air Force Systems Command regulations were reviewed in detail. Also, an extensive literature search was conducted using the research facilities of the Air Force Institute of Technology (AFIT) library. This literature search encompassed documents available from the Defense Documentation Center (DDC), reports listed in the Government Reports Annual Index from 1966 to 1975, and previous theses and

professional studies listed in the Air University Abstracts of Research Reports. Several research and development related journals such as Research Management were also reviewed. The information gathered during this documentation review was used to formulate a preliminary schedule of interview questions.

This set of preliminary questions was reviewed and discussed with the researcher's thesis advisor and several laboratory and product division personnel who had provided comments regarding the assessment process in response to Gen Hudson's 29 January letter. The comments received during this review process provided the basis for developing a subsequent set of interview questions. A trip was then made to Andrews Air Force Base, and these questions were reviewed and discussed with HQ AFSC personnel who had participated in the formulation of the assessment policy. The comments received and the additional information obtained regarding the background of the assessment policy was then used to further revise the schedule of interview questions.

The third version of the interview schedule was used to conduct four trial interviews. Only minor modifications were made to the questions following these trial interviews, and the data collected during these interviews are included in the data base used for analysis.

The interview schedule formulated as a result of these activities is shown in Appendix C. The nineteen questions developed are designed to gather information in the following areas: (1) demographics, (2) effect of ADTP assessments on technology transfer, (3) effect of ADTP assessments on communication and dialogue, (4) relative ease or difficulty of accomplishing principal assessment tasks, (5) laboratory responsiveness, (6) general attitude of personnel toward the assessment process, and (7) the

relative merit of additional technology transfer mechanisms. The intent of the specific questions and many of the considerations that had to be made in developing these questions are discussed below.

Demographics. The demographic factors used in this research effort are the individual's organization, grade, time of service in the research and development field, and time in present job assignment. Questions 1 through 4 were used to collect this information. It was felt that the answers to the interview questions would be the most dependent upon these factors. The individual's organization was deemed important because of the obvious fact that the work of one organizational entity (the laboratory) is assessed by another (the product division). The individual's grade was included because it was felt that there might be a difference in the answers given by the higher grade personnel as opposed to those given by the lower grade personnel. Similarly the length of service in the R&D field and the time in the present job assignment were included because it was felt that the answers to the interview questions might depend upon these longevity factors.

Personnel working in the product divisions were asked the additional demographic question stated below:

> Question 5: If you work in a product division, please select the one statement which comes closest to representing the degree to which you have participated in ADTP assessments. I have:

Seven different responses were listed, and these responses ranged from "not heard of the ADTP assessment requirement before today" to "been a focal point for gathering comments for ADTP assessment." Other personnel were intentionally not asked this question because it was recognized that they would primarily be advanced development technology program managers.

It was felt that the degree of participation of these individuals in the assessment process would be defined by virtue of their work assignments.

Technology Transfer. The measurement of the perceived effect of the ADTP assessment process on the transfer of technology was accomplished through interview Questions 6, 7, and 8. In these questions the person interviewed was asked to indicate if he felt that the assessment process would foster events which appear to aid the transfer of technology and if he felt that the assessment process would change the significance of several proposed barriers to technology transfer.

A seven-point scale was provided for the purpose of recording the answers to these questions. The available responses were "strongly disagree," "disagree," "inclined to disagree," "undecided," "inclined to agree," "agree," and "strongly agree." This seven-point scale was chosen over a more standard five-point scale in order to reduce the number of tied responses. It was anticipated that the small size of the data base resulting from the interview approach would dictate the use of nonparametric statistical tests in analyzing the interview results. Many of these tests are based upon ranks, and they generally require a minimum number of ties. The specific tests used are discussed more throughly in the section on data reduction.

Question 6 was designed to determine if the personnel interviewed perceived that the assessment process would encourage the occurrence of certain events which appear to aid the transfer of technology. The specific events that the personnel interviewed were asked to consider are listed below:

1. Conduct of planning activities which serve to expose potential problems before they become serious.

2. The establishment of a forum within which problems may be resolved as they come along.

3. The emergence of strong manufacturer (e.g., product division) support of a technology resulting in a balance between "technology push" and "demand pull."

4. Establish that the technology is sufficiently mature so that those involved can see that the remaining technical and cost barriers are soluble.

5. The existance of an early informational linkage between the innovator (e.g., the laboratory) and the needer (e.g., the product division and/or the user).

These five aiding events were developed primarily from a consideration of the results of the study conducted by the Syracuse University Research Corporation (see Chapter II). The use of these events in this research effort was considered highly desirable because of the similarity of the "linkage" concept expressed by the Syracuse group and the concept of "ties" between the laboratories and the product division implied by the suggestions made by the Air Force LUS group (Allen, 1975:26). However, it was felt that some corroboration of the applicability of the Syracuse group's results to this research effort was required. This seemed necessary because the Syracuse study addressed the transfer of technology from federal laboratories to commercial use rather than from federal laboratories to weapon system application.

Two different approaches were followed in order to obtain the desired corroboration. First, the management factors identified by the Project Hindsight study team as those which appear to enhance the utilization of technology were compared with the linkages required for technology transfer that were identified by the Syracuse study group. Although the findings of the two study groups were not identical, it is felt that a great degree of similarity exists. For example, the Project Hindsight study team found that most utilized technology comes from programs in

response to particular DOD problems (ODDR&E, 1969:40). The corresponding finding by the Syracuse study group was that "in the most successful cases the emphasis was on solving a problem independent of a 'setting-on-the-shelf' technology. . . ." (Teich, 1974:43). Another comparison that can be made is the finding regarding the need for a demand for the technology to be established. The Project Hindsight team found that in almost 85% of the utilized technology advances studied that the application engineering group originally expressed the need for a problem resolution (ODDR&E, 1969: 47). Correspondingly, the Syracuse group concluded that a capability-need matching was required--to establish a balance between technology push and demand pull (Teich, 1974:43). Other comparisons can be made. The results of these two studies are briefly summarized in Chapter II for the reader's convenience.

The second approach taken to corroborate the use of the Syracuse study group's results was to identify which Air Force agencies perform the basic functions of innovation, manufacture, and utilization that were identified by the Syracuse study group (Teich, 1974:2). The laboratories, by virtue of their efforts to develop the technology base, are involved with the creation or adaptation of technology. They can be considered as the agency responsible for innovation. The product divisions, by virtue of their efforts to manage the acquisition of new weapon systems are involved in the production of technology for use by the operational commands. The product divisions, therefore, accomplish a function similar to that of the manufacturer. The operational commands can be thought of as the user in that they employ the technology "manufactured" by the product division.

Questions 7 and 8 were designed to determine the perceived significance of several factors thought to be barriers to technology transfer.

Question 7 addressed the situation perceived before the assessment process went into effect, and Question 8 addressed the situation perceived after the assessment process went into effect. The obvious intent of these two questions was to determine if the ADTP assessment process was perceived to affect the significance of any of these barrier factors.

The proposed barrier factors that the personnel were asked to consider in answering Questions 7 and 8 are listed in Table II. The eight primary factors are identical to the barriers identified as existing between organizational subsystems by Dr. Gartner and Dr. Naiman (Gartner, 1976:23). The subfactors identified in Table II were formulated by the researcher, but they were based upon the work accomplished by a National Science Foundation sponsored study designed to investigate barriers to innovation in industry (Michaels, 1973:120-151).

Gartner and Naiman identified three organizational "systems" which comprise the environment for technology transfer and identified a set of barriers to this transfer for each organizational system level (see Chapter II). Ideally, the perceived significance of the barriers at all three organizational system levels would have been determined. However, this would have required the personnel interviewed to consider twenty different barrier factors, and it was felt that such a task would have been too time consuming for the interview technique. It was therefore decided to select the one organizational system level that best represented the level at which technology is transferred to weapon system application. The barrier factors corresponding to the selected organizational system level would then be used in Questions 7 and 8.

The selection of the subsystem level was based upon the following considerations. The transfer of technology to weapon system application

TABLE II

DEFINITION OF

PROPOSED BARRIERS

1. INERTIA BARRIERS

Product too different from what has been done in the past.
A predominant commitment to "current technology" rather than supporting advanced technology concepts and subsystem.
Uncertainty of internal predictions of cost, schedule, and performance.

2. LACK OF AN INCENTIVE STRUCTURE

Advanced Development Technology Program funding technique.
Discouragement of long term efforts.
Individual fear of being blamed for failure.
Lack of a laboratory performance evaluation system.

3. COST BARRIERS

Unavailability of cost information critical to decision making.
Predicted ADTP cost too high.
No way to evaluate expected "return-on-investment" of an ADTP.
Excessive cost required to "re-engineer" an ADTP product before it can be used in a system application.
Lack of funds to support an ADTP, including contract funding.

4. COMMUNICATION BARRIERS

Lack of coordination among various agencies or offices (e.g., staff with engineering, laboratories with product divisions, etc.).
Functional specialist have inadequate understanding of other function (e.g., engineering of laboratory or vice versa).
Customer needs cannot be easily translated into an ADTP definition.

5. TIME BARRIERS

Unavailability of schedule information critical to decision making.
Lack of sufficient calender time to complete ADTP.
Conflict between time horizon of product division customers and the laboratories.
High risk of early obsolescence.

TABLE II CONTINUED

6. GEOGRAPHIC DISTANCE

Distance between product division and laboratory.
Distance between ADTP contractor and laboratory.

7. NONEXISTENT TRANSFER MANAGEMENT STRUCTURE

Lack of clear procedures and policies for approving and/or reviewing an ADTP.
Lack of a specific policy to insure transition of laboratory developed equipment to the product divisions.
Existence of a prevalent "NIH" syndrome.
No mechanism for the transfer of technical knowledge.
Limited mobility of individuals.

8. TECHNOLOGY BARRIERS

Technology base not suitable for advanced development.
Unavailability of information critical to predicting the performance of an ADTP product.

(Gartner, 1975:23; Michaels, 1973:120-151)

generally occurs with the transition from advanced development to engineering development, that is, the transition from experimental hardware to hardware being designed for service use (AFR 80-1, 1970:2). Also, the agencies generally responsible for these two activities are the AFSC laboratories and the AFSC product divisions. Thus, the transition generally occurs within the organization responsible for managing Air Force R&D--AFSC. It was felt that Dr. Gartner's definition of the subsystem level was more compatible with the situation described above than his definition of the General System level. The General System level appears more descriptive of the transfer which takes place between the AFSC and other Air Force commands.

Communication and Dialogue. Communication is interpreted as relative to both verbal and nonverbal forms of information exchange. Also, it was postulated that the assessment process might affect the overall communication pattern of laboratory and product division personnel. That is, the amount of time that these personnel would spend in communication with personnel working in agencies other than the laboratories and product divisions might also be affected. Thus, the interview questions pertaining to communication were designed to address the following three factors: (1) the increase, if any, of the visibility of ADTPs within the laboratories and product divisions, (2) perceived changes to an individual's pattern of communication with various Air Force agencies regarding new ADTPs, and (3) the adequacy of expected communication between laboratory and product division personnel. Interview Questions 9, 10, 11, 12, and 13 addressed these factors.

Dialogue is interpreted as being primarily a verbal exchange of information. The anticipation of increased dialogue between laboratory

and product division personnel was measured by interview Question 14.

Questions 9 and 10 were designed as companion questions:

> Question 9: Below is a list of advanced development programs/projects either being considered or currently ongoing in the laboratories. Please place a check mark beside a program/project if you learned of it because of the ADTP assessment policy/activity.
>
> Question 10: Can you think of any other advanced development programs/projects that you now know about but probably would not have learned of if the ADTP assessment policy/activity had not occurred?

A list of fifteen advanced development programs which had been assessed by the product division prior to the start of this research effort was provided in Question 9. Question 10 was included because the list of programs in Question 9 was not all inclusive. The intent of these two questions was to obtain some indication of the extent that the assessment process will increase the visibility of advanced development programs. The stimulus for asking these questions was one of the suggestions made by the Air Force LUS survey respondents (Manley, 1974:2).

Questions 11 and 12 were designed as "before" and "after" questions:

> Question 11: What is your best estimate of the percent of your working time that was spent communicating with personnel in the agencies listed below regarding new ADTPs before the ADTP assessment requirement went into effect?
>
> Question 12: What is your best estimate of the percent of your working time that is or will be spent communicating with personnel in the agencies listed below regarding new ADTPs now that the ADTP assessment requirement is in effect?

The agencies listed in these two questions were "higher headquarters," "product division," "laboratories," "Air Force Logistics Command (AFLC)," and "operational commands." The intent of these two questions was to determine if the personnel interviewed perceived that the ADTP assessment process either has changed or will change their communication patterns.

Question 13 was stated as a "should be" question.

> Question 13: How much of your working time <u>should be</u> spent communicating with personnel in the laboratory (product division) in order for you to stay aware of status of advanced development programs (systems) which are relevant to your job?

The general intent of this question was to determine if the amount of communication between personnel working in the laboratories and product divisions was perceived to be more or less than it should be. It was felt that this could be accomplished by comparing the answers received in response to this question with appropriate answers received in response to Question 12.

The final question related to the communication and dialogue area was stated as follows:

> Question 14: Do you think that the ADTP assessment policy will improve the dialogue between yourself and and the product division (laboratory)?

The intent of this question was to obtain a direct measure of the perceived effectiveness of the assessment process with respect to improving the dialogue between the product division and laboratory personnel. Also, only two choices were provided--"yes" and "no." This was done intentionally in order to force a decision.

<u>Assessment Tasks</u>. The measurement of the relative ease or difficulty of accomplishing the principal tasks required by the ADTP assessment process was done through the use of interview Questions 15 and 16. The first of these questions was answered by the laboratory personnel, and the second was answered by product division personnel. The principal purpose of these questions was to determine if significant problems were encountered in performing the assessment tasks. Each question contained two parts as shown below:

Question 15a: If you work in a laboratory, how difficult is it (or "would it be") for you to obtain what you feel is reliable information on each of the following items to include in the technology program plan?

Question 15b: Do you think that the product divisions have enough time and manpower to devote to the assessment process?

Question 16a: If you work in a product division, how difficult is it (or "would it be") for you to perform what you feel is a reliable assessment of an ADTP with respect to each of the following items?

Question 16b: Do you think that the product divisions have enough time and manpower to devote to the assessment process?

The items that the personnel were asked to consider were derived from the general outline of the in-depth assessment paper which is attached to AFSCR 80-19 (see Appendix B). The items that the laboratory personnel were asked to consider were "payoff," "schedules," "ADTP cost estimates," "priority," and "alternate approaches." The items that the product division personnel were asked to consider were "payoff," "schedules," "ADTP cost estimates," "priority," and "decision options." The laboratory personnel were asked to consider "alternate approaches" rather than "decision options" because the former item was considered more representative of the information that would be included in the technology program plan. The suggestion of changing the laboratory items list to include "alternate approaches" in lieu of "decision options" was made to the researcher during the trial interviews conducted with laboratory personnel.

A seven-point scale was provided for the personnel to mark their responses in order to reduce the number of tied responses. The available choices for answers were "virtually impossible," "very difficult," "somewhat difficult," "neither difficult nor easy," "somewhat easy," and "very easy."

The stimulus for including the second part of these questions was obtained during the trial interviews. Two of the four persons interviewed expressed some concern as to whether enough time and manpower was available to devote to the assessment process. It was therefore decided to add a question addressing this issue. Two answers were provided--"yes" and "no."

Laboratory Responsiveness. The degree of perceived laboratory responsiveness was addressed by interview Question 17.

> Question 17: Another goal of the ADTP assessment policy is to increase the responsiveness of the laboratories to the product divisions with respect to the conduct of advanced development programs. Please indicate your thought on the degree of responsiveness that should exist and what will exist now that the ADTP assessment policy is in effect.

This question was included because improving laboratory responsiveness to the product division was one of the primary objectives of the assessment process identified in Gen Hudson's 29 January 1975 letter (AFSC (CV) letter, 29 Jan 1975:Par 1; see Appendix B). The question was formulated in a "what should be" and a "what will be" format in order to determine if the personnel interviewed perceived that the laboratories will be more responsive or less responsive to the product division than they should be.

A seven-point scale was provided in order to reduce the number of tied responses. The available choices for answers were "nonresponsive," "neither responsive nor nonresponsive," "to a small extent responsive," "somewhat responsive," "for the most part responsive," and "exceedingly responsive."

Personnel Attitude. The general attitude of the personnel interviewed toward the ADTP assessment policy was measured with the following direct question:

Question 18: The ADTP assessment policy is a good idea.

The seven-point response scale for expressing agreement and disagreement which has been previously discussed was used for this question.

Additional Technology Transfer Mechanisms. The last question asked during the interviews was designed to determine if additional technology transfer mechanisms might be desirable. The personnel interviewed were provided a description of five possible additional actions that might be taken to further improve the transfer of technology. They were then asked to indicate if they felt that these proposed actions had enough merit to warrant further consideration. The specific actions proposed are listed below:

1. Have the product divisions annually rate the laboratories with respect to generating transferable technology.
2. Have the laboratories annually rate the product divisions with respect to using the technology that the laboratories generate.
3. Both 1 and 2.
4. Somehow make funding for future ADTPs conducted by the laboratories contingent upon the completion of technology transfer in the past.
5. Establish a technology transfer agency staffed by professionals in technology transfer. This agency would develop a strategic plan, structure organizational relations, act as a product advocate, and intervene at key points (with funds if necessary). The agency would also have to be willing to risk failure and not be unduly criticized when a new technology program does not prove successful.

These proposed actions were formulated by the researcher based upon a review of several recommendations made by the Syracuse study group (see Chapter II). The seven-point response scale for expressing agreement and disagreement which has been previously discussed was used for this question.

The primary intent of the question was to explore the idea of incorporating additional technology transfer mechanisms and to solicit comments

regarding this area. It was felt that if a preference was shown for one of these proposed actions, further study could be devoted to establish the specific procedure.

Interviews

Initial Considerations. Once it was decided to use structured interviews as the data collection mechanism for this research effort, the next major task was to determine exactly with which personnel to seek interviews. However, two subtasks had to be accomplished prior to making this determination. First a set of criteria for selecting the personnel to interview was needed. The ultimate goal of the research effort required that the laboratory and product division personnel who are charged with implementing and executing the process be interviewed. This implied that the interviews be directed toward laboratory personnel who manage ADTPs and product division personnel who perform the assessments. It was felt that the supervisors of these personnel and key people in the planning offices should also be considered.

With the above criteria in mind an attempt was made to estimate the size of the population to be sampled. Although the estimates are inexact, information obtained during the interview question formulation review suggested that anywhere from 100 to 300 personnel assigned to the laboratories and product division under consideration would meet the established criteria. Although it was desirable to talk to as many of these people as possible, it was recognized that the time available for actually conducting the interviews would impose a practical limitation of twenty to fifty interviews. Thus, it was decided to attempt to schedule interviews with those personnel who had previously become the most involved with the assessment process.

The second subtask that had to be accomplished was to determine the relative proportion of the interviews that should be scheduled with laboratory and product division personnel. In theory, the appropriate proportions could be estimated by determining how many laboratory and how many product division personnel were the "most involved" in the assessment process. Discussions with people on this subject lead to estimates that varied considerably. Thus, the proportions which would have resulted from these estimates were not considered reliable. It was therefore decided, somewhat arbitrarily, to seek approximately an equal number of interviews with laboratory and product division personnel.

Personnel Selection. A logical starting point for determining who had been the most involved in the assessment process was to identify what assessments had been previously made by the product division. Toward this end, it was determined that four in-depth assessments were either in process or had been completed by the product division and that "quick response" prioritization assessments had been completed. The personnel who were focal points for performing these in-depth assessments and the corresponding advanced development program managers in the laboratories were identified with the assistance of a point of contact established in the Development Plans Office of the product division. Additionally, several other product division and laboratory personnel who had been closely involved with the assessment process were identified. Approximately twenty key individuals were identified in this initial effort.

Contact was made with as many of these twenty individuals as possible, and interviews were scheduled with them. As these interviews progressed, additional personnel who had either been involved in the assessment process or who were advanced development technology program managers

were identified, and interviews were also sought with these individuals. The determining factors as to whether an interview was scheduled or not were the researcher's success in contacting the personnel to be interviewed and their subsequent availability. In all, thirty-eight interviews were held.

Conduct of Interviews. Interviews with the above personnel were scheduled during the three-week period from 29 April 1976 to 20 May 1976. The interviews were conducted on an individual basis and generally were completed without interruptions. Four of the interviews, three of them with the HQ AFSC personnel, were not conducted personally by the researcher. Instead the individuals answered the questions separately and returned the completed interview schedules to the researcher at a later time. The time required for an interview ranged from half an hour to three hours, but normally the interview period lasted approximately an hour.

Although the interview questions were structured, the atmosphere of the interviews was informal and relaxed. The typical procedure followed was to allow the individual to read the questions, select his answers, and offer verbal and written comments as desired. The degree of dialogue between the researcher and the person interviewed varied from interview to interview. Generally the dialogue was both open and frank. Many of the verbal comments, as transcribed by the researcher, and the written comments, directly quoted, received during the interviews are listed in Appendix E. These comments are segregated by the question which provided the stimulus for the comment and by the organization of the person interviewed--either laboratory, product division, or other.

Structured Interview Results. The answers obtained to the structured questions are summarized in Appendix D. The data base is shown in

two different formats. The first format shows the number of responses to each answer for each of the structured questions. In addition, alongside each question and response set, a histogram of the responses is given. A "subjective feel" for the data can be quickly realized by reviewing the histograms presented in this format.

The second format presented is similar to the first except that the histogram printout is suppressed. Additionally, the responses are shown by the organization of those interviewed. For a given answer choice the top figure represents the number of personnel that selected that answer, and the bottom figure is the corresponding percentage. The percentage is based upon the appropriate column total.

Data Reduction

The primary reason for formulating a set of structured interview questions was to provide a mechanism for collecting information that could be analyzed in an objective and systematic fashion. This section is a discussion of the various analytical techniques used in performing this analysis of the interview data. Emphasis is placed upon indicating that the techniques are applicable to the interview data base and the type of conclusions that can be drawn. No attempt is made to present a detailed mathematical explanation of the analytical techniques; however, suitable reference is made to the source documents so that the interested reader can obtain this information.

The analytical techniques used in analyzing the data are those generally thought of as being either distribution-free or nonparametric. These techniques are ideally suited for use in the research effort in that no assumptions are necessary regarding the nature (e.g., normal) of the underlying population distribution.

Assumptions. The principal assumptions required are that the personnel interviewed represent a random sample and that their responses are independent (Conover, 1971:2, 3, 99, 121, 150, 265, 309, 314). The method by which a sample is obtained from a given population determines if it is a random sample. The principal requirement is that the selection method insures that each of the possible samples is equally likely to be obtained (Conover, 1971:62).

It is felt that the "equally likely" requirement is reasonably satisfied by the method used to select which laboratory and product division personnel to interview. First potential personnel to be interviewed were suggested by approximately ten different people acting independently. Secondly, an attempt was made to contact most of these personnel. Finally, those personnel who were actually interviewed were selected by a set of fortuitous circumstances which included the researcher's success in contacting them and their subsequent availability for the conduct of the interviews. Thus, it appears reasonable to assume that the two samples obtained were as equally likely as any other samples of laboratory and product division personnel that could have been obtained. It is also felt that the answers to the interview questions represent independent responses. Except for the four interviews which were not conducted in person by the researcher, all interviews were conducted in private. Also, those interviewed did not have access to the interview questions prior to the actual conduct of the interviews. It is felt that these factors eliminated any opportunity for collaboration between individuals.

Statistical Hypothesis Testing. Most of the analytical techniques used in analyzing the interview data are those applicable to the class of statistical problems known as hypothesis testing. Consequently many of the

conclusions reached as a result of the research effort are based upon the rejection of a specific statistical hypothesis. A brief review of the principal steps of hypothesis testing procedure followed in this research effort is therefore given below:

1. The hypotheses are stated in terms of the population.

2. A test statistic is selected.

3. A rule is made, in terms of possible values of the test statistic, for deciding whether to accept or reject the hypothesis.

4. On the basis of random sample from the population, the test statistic is evaluated, and a decision is made to accept or reject the hypothesis (Conover, 1971:76).

Statistical hypotheses are stated in two forms: a null hypothesis and an alternate hypothesis. The null hypothesis is denoted H_0, and it normally corresponds to a statement about the population that is desired to be shown false. For example, the statement "the personnel interviewed perceived that the ADTP assessment process did not affect the significance of the technology transfer communication barrier" is representative of a null hypothesis. The alternate hypothesis is simply the negation of the null hypothesis and is denoted H_1.

A test statistic is selected by virtue of selecting a specific statistical test. The statistical test procedures define the method for computing the value of the test statistic and the general rule for deciding whether to accept or reject the null hypothesis. This rule is based upon some knowledge regarding the values that the test statistic will take on if the null hypothesis is in fact true. Generally, this knowledge is expressed in terms of the probability distribution of the test statistic.

The results of hypothesis tests performed as part of this research

effort are presented in terms of a level of significance, denoted $\hat{\alpha}$. This parameter is determined from the computed value of the test statistic. It is the maximum probability of rejecting a true null hypothesis. For the purposes of this research, the null hypothesis is rejected if the level of significance is less than or equal to the critical value of .05.

Kendall's Coefficient of Concordance. This analytical technique provides a means to measure agreement or concordance among several observers regarding the ranks they assign to a set of objects. The principal parameter of this analytical technique is called the coefficient of concordance and is denoted W. This parameter represents the amount of overall agreement of the observers, when taken as a group, regarding the ranks assigned to the objects. If there is perfect agreement among the observers regarding the rankings then W = 1, and if there is no agreement, W = 0. The basis for computing the coefficient of concordance is the algebraic sum of the ranks assigned to each of the objects (Kendall, 1955:94, 95).

In theory, the coefficient of concordance could be used as a test statistic to evaluate the null hypothesis that there is no agreement among the observers regarding the ranks assigned to the objects, but the probability distribution of W is difficult to calculate. Fortunately a test statistic which is a function of the coefficient of concordance has been developed, and this statistic follows a Snedecor's F probability distribution (Gibbons, 1971:253-255). This test statistic is denoted F and is used to compute the level of significance when testing a null hypothesis.

If an observer assigns an equal rank to two or more objects, then these objects are considered as being tied in the rankings. The effect of tied rankings is to reduce both the coefficient of concordance and the F statistic. A correction for tied rankings has been developed by Gibbons

(Gibbons, 1971:233, 256-257). This correction requires that the objects with tied ranks be assigned the average rank that would have been assigned to these objects if a tie had not occurred. All computations of the values of the coefficient of concordance and the F statistic presented in the thesis have encorporated the above correction for tied ranks.

It is felt that the coefficient of concordance can be used in analyzing the answers obtained for several of the interview questions. Each person interviewed can be considered an observer, and the factors that the person interviewed was asked to score can be thought of as the objects to be ranked.

An example of a question to which the technique can be applied is Question 6. Each person interviewed was asked to indicate if he felt that the assessment process would encourage the occurrence of several events which appear to aid the transfer of technology. These events can be considered as objects for the purpose of computing a coefficient of concordance. Also, the seven-point scale that the individual used to mark his answer is structured such that the extent of agreement or disagreement can be determined. This answer scale provides a means of assigning ranks to the various events.

The procedure used to assign a rank to an event is summarized in Table III. A response of "strongly disagree" is considered the least preferred, and a response of "strongly agree" is considered as the most preferred in assigning the ranks. Referring to Table III, the event "establish an early informational linkage" is ranked "5" because the event was scored the highest--"strongly agree." The events "planning activities which may expose problems" and "provide a forum for problem resolution" were both scored "inclined to agree." Thus, both events were assigned an equal rank.

TABLE III

PROCEDURE FOR ASSIGNING

RANKS TO QUESTION 6 EVENTS

EVENT	INDIVIDUAL'S RESPONSE	RANK ASSIGNED
Planning Activities Whick May Expose Problems	Inclined to Agree	3.5
Provide a Forum for Problem Resolution	Inclined to Agree	3.5
Strong Product Division Support	Undecided	2
Establish That Technology Is Mature	Disagree	1
Establish an Early Informational Linkage	Strongly Agree	5

The rank "3.5" is the average rank that these two events would have been assigned had they not been scored the same (i.e., 3.5 = (3 + 4)/2). Continuing the process, the events "strong product division support" and "establish that technology is mature" are ranked "2" and "1" respectively because these events were scored "undecided" and "disagree."

Appropriate hypotheses for this question can be stated as follows:

H_0: There is no agreement among those interviewed regarding which events the ADTP assessment process will encourage.

H_1: There tends to be some agreement among those interviewed regarding which events the ADTP assessment process will encourage.

The decision whether to reject or accept the null hypothesis is made of the basis of the value of the level of significance computed from the F statistic discussed earlier.

Arguments similar to those above can be made to indicate that coefficients of concordance can also be used to analyze the responses obtained for Questions 7, 8, 11, 12, 15a, 16a, and 19. The results of these analyses are discussed in Chapter IV. The specific values computed for the key parameters are tabulated in Appendix F.

True Preferential Order. One shortcoming of the coefficient of concordance test is that rejection of the null hypothesis only indicates that there is some agreement among the observers regarding the ranking of the objects. There is no indication of the true preferential order of the objects. Gibbons suggests that the preferential order might be estimated by assigning ranks on the basis of the rank sums computed in order to determine the coefficient of concordance. She further demonstrates that this technique results in a best estimate for the preferential order, in a least-squares sense (Gibbons, 1971:255, 256). This technique is used in analyzing the responses to questions for which a coefficient of concordance was computed.

Multiple Comparisons. The preferential ordering technique proposed by Gibbons also exhibits a shortcoming. Although the true ranks can be estimated, there is no indication of whether the difference in the ranks assigned is statistically significant. A hypothesis test based upon multiple comparisons of the rank sums computed in order to determine the coefficient of concordance overcomes this shortcoming (Hollander, 1973:151-154).

This multiple comparison test can be used to determine if the rank assigned by the observers, acting as a group, to one object differs statistically from the rank assigned to a second object. The assumptions are the same as those required by the coefficient of concordance test. The test statistic is computed as the absolute value of the difference in the rank sums of the two objects. This test statistic does not follow a standard probability distribution; however, tables which can be used to determine the level of significance are available (Hollander, 1973:330, 373-378).

The multiple comparison test may be applied to the same questions as the coefficient of concordance test because the assumptions are the same. An example of the type of hypotheses that can be tested with the multiple comparison test can be formulated using Question 6 as follows:

H_0: Those personnel interviewed perceived that the occurrence of the events "establishment of an early informational linkage" and "establish technology is mature" will be equally encouraged by the ADTP assessment process.

H_1: Those personnel interviewed perceived that the occurrence of these two events will not be equally encouraged by the ADTP assessment process.

Sign Test. The sign test is useful in drawing inferences about data which comes in x-y pairs. The additional assumptions required by this test are that there is some natural basis for pairing the responses and that the measurement scale used to record the responses is such that

a pair can be classified as a plus if x is less than y or as a minus if x is greater than y (Conover, 1971:121).

This test can be used to test hypotheses about the responses to Questions 7 and 8, 11 and 12, 12 and 13, and 17. The responses of each individual can be considered one x-y pair. The structure of these questions allows for natural grouping of the data in terms such as "before" and "after," and "what should be" and "what will be." Also, the measurement scale used in these questions allows for the pluses and minuses to be determined.

The test statistic for this test is the total number of plus pairs obtained, and the probability distribution of the test statistic is the standard binomial distribution (Tables, 1955). The sign test is a very popular nonparametric test and is discussed in detail in most nonparametric statistics textbooks (Conover, 1971:121-126; Gibbons, 1971: 100-106; Hollander, 1973:39-45).

One situation encountered in using the sign test to analyze the interview data was that many individuals marked the same answer for the x-response and the y-response. These tied observations result in neither a plus or a minus. Tied observations are normally discarded when using the sign test, but it is felt that this procedure leads to misleading conclusions if there are many ties. A conservative approach was therefore adopted in order to include the tied observations. This approach is identified by Gibbons and requires that the tied observations be considered as minuses when evaluating the level of significance (Gibbons, 1971:102).

The sign test is used to test hypotheses similar to those listed below:

H_0: The personnel interviewed perceived that the communication barrier to technology transfer was less significant before the ADTP assessment process went into effect.

H_1: The personnel interviewed perceived that the communication barrier to technology transfer was more significant before the ADTP assessment process went into effect.

Two-sample Tests. These tests are useful in making inferences regarding differences in the responses given by two different groups of personnel. Two different two-sample tests are used to analyze the interview data collected during the research effort: the Smirnov test and the contingency table test. The distribution function for the Smirnov test statistic has been extensively tabled (Birnbaum, 1960:710-720; Massey, 1952:435-441; Hollander, 1973:397-418). The distribution function for the contingency table test statistic is the standard Chi-square distribution (Conover, 1971:152). These tests are in common use and are discussed in detail in most nonparametric statistics textbooks (Conover, 1971:309-314, 149-166). A detailed discussion of these tests is therefore not provided.

Two different tests were required because of the structure of the answer scale. The answer scale must be such that the responses can be ranked from low to high in order to use the Smirnov test (Conover, 1971:309). This requirement is satisfied by the answer scales associated with Questions 6, 7, 8, 11, 12, 13, 15a, 16a, 17, 18, and 19. However, the answer scales associated with Questions 14, 15b, and 16b are simply "yes" and "no," and therefore do not satisfy the ranking requirement. The contingency table test was used to analyze the responses to these questions.

A typical set of hypotheses which can be tested with the two-sample tests are listed below:

H_0: There tends to be no difference between the responses given by the laboratory personnel and those given by product division personnel in answer to Question 18 which asks if "the ADTP assessment policy is a good idea."

H_1: Personnel in these two organizations tend to give different responses in answer to Question 18.

Confidence Interval Estimation. This analytical technique is not used to test a statistical hypothesis. Instead, it is useful in making inferences regarding some unknown parameters associated with a sample population. The confidence interval is composed of two components: a confidence coefficient and an interval estimate (Conover, 1971:99-103). The confidence coefficient must be selected prior to using the technique. A value of 95% has been selected for this research effort. The interval estimate is determined by appropriate computations and is typically specified in terms of a lower and an upper bounds for the unknown parameter.

It is felt that one population parameter which is useful in interpreting the data collected during this research effort is the proportion of personnel who have given a particular response to an interview question. Confidence intervals for this parameter may be determined for any of the interview questions. However, they are generally only computed for those questions which have a single set of possible answers (e.g., Questions 14, 15b, 16b, and 18).

Chapter Summary

This chapter is a discussion of the process used to formulate specific interview questions, the questions themselves, and the methodology followed in scheduling and conducting interviews with personnel familiar with the ADTP assessment policy. An overview of many of the analytical techniques used in the reduction of the interview data is also presented.

The interview questions were developed through a process of

question formulation and review. Information obtained through an extensive search of relevant literature and comments received from key personnel assigned to HQ AFSC, one product division, and two laboratories were used to formulate a final set of interview questions. The nineteen questions developed through this process are designed to gather information in the following areas: (1) demographics, (2) effect of ADTP assessments on technology transfer, (3) effect of ADTP assessments in communication and dialogue, (4) relative ease or difficulty of accomplishing principal assessment tasks, (5) laboratory responsiveness, (6) general attitude of personnel toward the assessment process, and (7) the relative merit of additional technology transfer mechanisms. The intent of the specific questions and many of the considerations that had to be made in developing these questions are discussed in detail in this chapter. The schedule of interview questions is given in Appendix C.

Only those personnel most involved with the assessment process were interviewed. Primarily those interviewed were laboratory personnel who manage ADTPs and product division personnel who had participated in the assessment process. However, the supervisors of some of these personnel and a few personnel from laboratory and product division planning offices were also interviewed. In all, thirty-eight interviews were conducted during a three-week period from 29 April 1976 to 20 May 1976. The data collected during these interviews is summarized in Appendix D.

The analytical techniques used in analyzing the interview data are those generally thought of as being either distribution-free or nonparametric. Most of these techniques are applicable to the class of statistical problems known as hypothesis testing, but a method of estimating confidence intervals is also discussed. Chapter IV follows and is a detailed discussion of the actual data analysis.

IV. Data Analysis

This chapter is a discussion of the analysis of the information received in response to the questions asked during the interviews. The formulation of the interview questions is discussed in detail in Chapter III. A summary of the data collected during the interviews is presented in Appendix D in two different formats. An explanation of these formats is presented in Chapter III under the section entitled "Structured Interview Results."

Analysis Approach

The structured interview questions provide both the data and the framework for the analysis. These questions were designed to gather information in seven different areas of interest (see Chapter III), and the analysis was conducted to address each of these areas separately. Within each of the seven principal areas of interest the analysis was generally conducted on a question by question basis. The analysis of the demographic questions being the exception.

Many factors were considered when performing the question by question analysis, and the specific approach taken varies from question to question. In general, both the subjective comments received during the conduct of the interviews and the conclusions obtained from applying appropriate analytical techniques were considered in developing findings. The analytical techniques used are discussed in Chapter III under the heading "Data Reduction."

The use of quantitative methods in analyzing the data required that each of the descriptive word answers be converted to a numerical value. The convention followed in assigning numerical values is shown in

Table IV. The entries in the first three table columns are the descriptive word answers used for the questions defined by the table column heading. The entries in the last column are the numerical value assigned to the word answer defined by the table row.

Demographics

The demographic variables used in this research effort are the individual's organization, grade, time of service in the R&D field, and time in present job assignment. The answers to the questions used to collect this information provided the basis for developing the specific demographic groupings defined in Table V. Note that only the All Personnel grouping includes the responses received from personnel not assigned to either a product division or a laboratory.

The demographic groupings defined in Table V can be categorized as either organizational or nonorganizational. The number of people interviewed in each of the organizational groupings is shown in Table VI. The relationship between the organizational and nonorganizational groupings is shown in Table VII. The Table VII entries are the number of personnel assigned to the organizational grouping defined by the table row and also included in the nonorganizational grouping defined by the table column.

Personnel working in three different laboratories were interviewed. Thirteen (76%) of these personnel either were or still are managers of ADTPs, and the remaining four (24%) were assigned to the laboratory plans office. Almost half (47%) of the laboratory personnel interviewed had been working in the R&D field more than twenty years, and eight (47%) had been in their present work assignments more than two years. Also, five (29%) of the personnel held grades and ranks that placed them in the higher grade demographic grouping defined in Table V.

TABLE IV

CONVENTION FOLLOWED IN ASSIGNING NUMERICAL VALUES TO DESCRIPTIVE WORD ANSWERS

Descriptive Word Questions 6, 7, 8, 18, 19	Descriptive Word Questions 15a and 16a	Descriptive Word Question 17	Numerical Value Assigned
Strongly Disagree	Virtually Impossible	Nonresponsive	1
Disagree	Very Difficult	Neither Responsive Nor Nonresponsive	2
Inclined to Disagree	Somewhat Difficult	To a Small Extent Responsive	3
Undecided	Neither Difficult Nor Easy	Somewhat Responsive	4
Inclined to Agree	Somewhat Easy	For the Most Part Responsive	5
Agree	Easy	Very Responsive	6
Strongly Agree	Very Easy	Exceedingly Responsive	7

TABLE V

DEFINITION OF DEMOGRAPHIC

GROUPINGS

Demographic Grouping and Short Title	Definition
All Personnel (All)	All personnel interviewed
All Laboratories (Lab)	All laboratory personnel interviewed.
Laboratory A Only (Lab A)	Laboratory personnel who worked in laboratory A.
Laboratory B Only (Lab B)	Laboratory personnel who worked in laboratory B.
Laboratory C Only * (Lab C)	Laboratory personnel who worked in laboratory C.
All Product Division Organizations (P.D.)	All product division personnel interviewed.
Product Division Organization A Only (P.D. A)	Product division personnel who worked in development planning organizations.
Product Division Organization B Only (P.D. B)	Product division personnel who worked in system engineering organizations.
GS-15/Lt Col and Above (GS 15 LC & Above)	All laboratory and product division personnel who held the civilian grade of GS-15 or higher and all military personnel who held the rank of Lieutenant Colonel or higher.
GS-14/Maj and Below (GS 14 Maj & Below)	All laboratory and product division personnel who held the civilian grade of GS-14 or lower and all military personnel who held the rank of Major or below.

TABLE V CONTINUED

Demographic Grouping and Short Title	Definition
Over Twenty Years Experience in R&D Field (Over 20 Years)	All laboratory and product division personnel who indicated that they had more than twenty years experience in answer to Question 3.
Under Twenty Years Experience in R&D Field (Under 20 Years)	All laboratory and product division personnel who indicated that they had twenty years or less experience in answer to Question 3.
More Than Two Years in Present Job Assignment (More Than 2 Yrs)	All laboratory and product division personnel who indicated that they had been in their present work assignment more than two years in answer to Question 4.
Less Than Two Years in Present Job Assignment (Less Than 2 Yrs)	All laboratory and product division personnel who indicated that they had been in their present work assignment less than two years in answer to Question 4.

* Not Considered as a Separate Demographic Grouping in Statistical Analysis Because Only Two Personnel Were Interviewed.

TABLE VI

NUMBER OF PERSONNEL INTERVIEWED

BY ORGANIZATIONAL GROUPING

Laboratories		Product Division		Other	
Laboratory A	6	Organizational Grouping A (Development Planning)	8	HQ AFSC	3
Laboratory B	9			Operational Command Liaison Office	1
Laboratory C	2				
Total Laboratory	17	Organizational Grouping B (System Engineering)	9	Total Other	4
		Total Product Division	17		

Total Interviews: 38

TABLE VII

RELATIONSHIP BETWEEN ORGANIZATIONAL AND

NONORGANIZATIONAL DEMOGRAPHIC GROUPINGS

	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Lab	5	12	8	9	8	9
Lab A	2	4	4	2	5	1
Lab B	3	6	4	5	2	7
Lab C	0	2	0	2	1	1
P.D.	8	9	11	6	13	4
P.D. A	2	6	5	3	8	0
P.D. B	6	3	6	3	7	2

The product division personnel interviewed were assigned to organizations in two principal categories. These categories were development planning and system engineering offices. Eleven (65%) of those interviewed had been focal points for ADTP assessments--either in-depth or "quick response" prioritization. Moreover, eleven (65%) of the product division personnel had been working in the R&D field more than twenty years, and thirteen (76%) had been in their present work assignment more than two years. Also, eight (47%) of these personnel held grades and ranks that placed them in the higher grade demographic grouping defined in Table V.

Although the primary thrust of the interview effort was directed toward obtaining feedback from laboratory and product division personnel, the views of four personnel assigned to other organizations were obtained as shown in Table VI. The information obtained from these individuals was used by the researcher in order to achieve a broader perspective of the assessment process, but generally the data was not used in the statistical test computations.

Two principal populations were sampled during the interview period. One of these was all laboratory personnel who were either advanced development program managers or assigned to the laboratory plans office and who were perceived by their contemporaries to be knowledgeable of the assessment process. The other population sampled was all product division personnel assigned to offices responsible for either development planning or systems engineering and who had participated in the assessment process. Those personnel identified in the Other organization category are not considered to be representative of a principal population because the number of interviews is so small.

Technology Transfer

The measurement of the perceived effect of the ADTP assessment process on the transfer of technology was accomplished through interview Questions 6, 7, and 8. In Question 6 the person interviewed was asked if he felt that the ADTP assessment process would encourage the occurrence of certain events which appear to aid the transfer of technology. In Questions 7 and 8 those interviewed were asked if they perceived certain factors to be a barrier to the transfer of technology. The conditions existing before and after the ADTP assessment policy went into effect were considered.

Technology Transfer Aiding Events (Question 6)

General. The specific events that the personnel interviewed were asked to consider were identified in Question 6 (see Appendix C and Chapter III). The mean response given by the various demographic groups defined in Table V for the proposed aiding events varied from 4.00 to 6.50. This numerical range corresponds to a word answer range from "undecided" to "agree." It is felt that the fact that these mean responses tend toward the "agree" end of the answer scale suggests that those interviewed perceived that, in general, these events would be encouraged by the assessment process. However, the analysis performed shows that some of the events are perceived to be more likely encouraged than others.

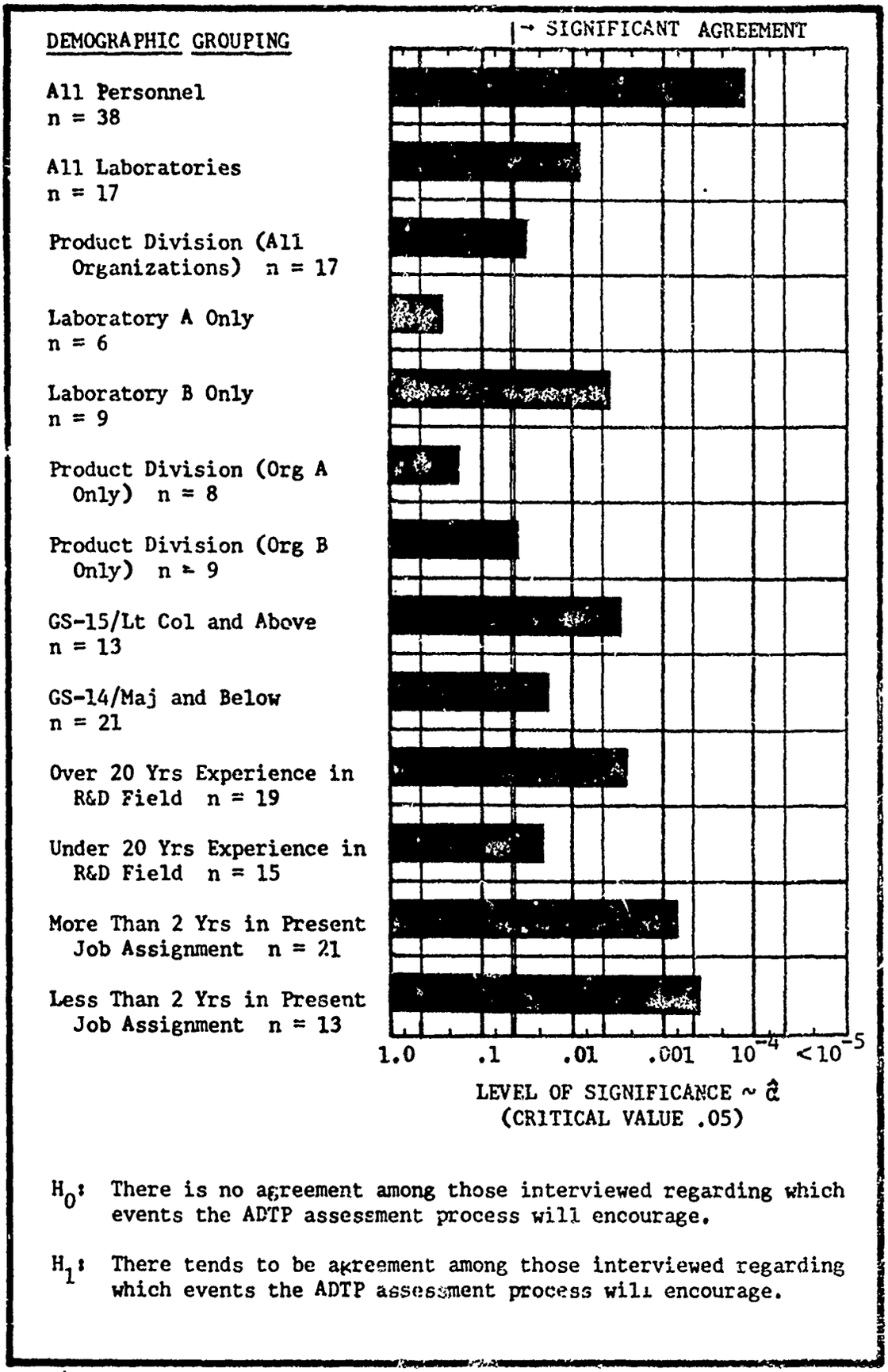
Perception of Events

Agreement. Overall there tends to be agreement among those interviewed regarding which events the ADTP assessment process will most likely encourage. Moreover, there generally tends to be agreement among the personnel within each of the demographic groupings considered. These findings result from testing the statistical hypothesis that there is no agreement among those interviewed regarding the ranking of the proposed

technology transfer aiding events. The coefficient of concordance and the corresponding level of significance were computed from the data representing each of the thirteen demographic groupings defined in Table V. The specific hypothesis tested and the results of the analysis are shown in Figure 5. The values of the key parameters computed in performing this test are tabulated in Appendix F.

The chart shown in Figure 5 is constructed to illustrate the value of the level of significance ($\hat{\alpha}$) computed for each of the demographic groupings. A reverse-logarithmic scale is used for plotting the level of significance. Very small values ($<10^{-5}$) of $\hat{\alpha}$ are plotted to the right of the scale, and large values ($\hat{\alpha} \approx 1$) are plotted to the left of the scale. Thus, if the level of significance is small, the bar will extend to the right. If the bar crosses the double vertical line, drawn at the critical value of .05, the null hypothesis of no agreement among the personnel is rejected. There tends to be more agreement among the personnel within a specific demographic grouping if the bar extends far to the right. The concept of the level of significance was discussed in Chapter III under the section entitled "Statistical Hypothesis Testing."

The results shown in Figure 5 indicate that the personnel assigned to laboratory A and to product division organization A did not tend to exhibit agreement regarding the ranking of the five technology transfer aiding events. From Table F-I it can be seen that the mean of the ranks assigned to these events by laboratory A personnel are 4.08, 3.08, 2.75, 2.58, and 2.50. Note that the mean ranks of the four lowest ranked events differ by only .58. A corresponding value of 2.00 was obtained when the same computations were performed using the mean of the ranks assigned by personnel (laboratory B) who did exhibit significant agreement regarding



H_0: There is no agreement among those interviewed regarding which events the ADTP assessment process will encourage.

H_1: There tends to be agreement among those interviewed regarding which events the ADTP assessment process will encourage.

Figure 5. Results of Coefficient of Concordance Tests--Technology Transfer Aiding Events (Question 6)

the ranking of the events. A comparison similar to the above was made for the means of the ranks assigned by the product division organization A personnel. For these personnel, the mean ranks of the four lowest ranked events differ by 1.12. Thus, the lack of agreement appears to be due to the ranking of the four lowest ranked events.

Observation and Comment. It is interesting to note that the two groups of personnel which failed to agree on the ranking of the aiding events were those most involved with the in-depth assessment process. Three of the four ADTPs for which in-depth assessments had been performed by the product division were laboratory A managed programs. Also, the product division organization A designation corresponds to the development planning office. This office was the focal point for conducting the assessment process (AFSCR 80-19, 1976:Par 3). The hypothesis that close involvement with the assessment process somehow contributes to lack of agreement regarding the ranking of the transfer aiding events is therefore suggested. However, this hypothesis cannot be tested with the present data base, and any conclusion drawn regarding its validity would be pure speculation. This hypothesis should therefore be investigated in any future research performed regarding the effect of the ADTP assessment process on the transfer of technology.

Preferred Order. Estimates of the true preferential order of the five technology aiding events were made by assigning ranks to the events as outlined in Chapter III (see Table III). Each demographic grouping was considered, and ranks were assigned if agreement among the personnel was shown to exist in Figure 5. If the agreement was not found, then it was assumed that the events were equally preferred. The ranks assigned to the events are shown in Table VIII.

TABLE VIII

RANKS ASSIGNED TO TECHNOLOGY TRANSFER AIDING EVENTS

Rank Assigned By:	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Establish Early Informational Linkage	5	5	5	No Significant Agreement	4	No Significant Agreement	5	5	5	5	4	5	4
Strong Product Division Support	4	4	3		5		4	4	3	3*	5	2*	5
Planning Activities Which May Expose Problems	3	3	4		3		2.5	2*	4	4	3	4	2**
Establish That Technology Is Mature	2**	2	2		2		2.5	3	1*	2*	2	1**	3
Provide A Forum For Problem Resolution	1**	1**	1*		1**		1**	1**	2	1**	1	3*	1**

** Difference from highest ranked event is statistically significant ($\hat{\alpha} \leq .05$).

* Difference from highest ranked event is marginally significant ($.05 < \hat{\alpha} \leq .1$).

Table VIII is constructed such that each aiding event is represented by a table row and each demographic grouping is represented by a table column. The numerical values shown in the table correspond to the rank assigned to a specific aiding event by the demographic group identified at the top of the table column. A value of "5" indicates the most preferred event, and a value of "1" indicates the least preferred event. The difference between the ranks assigned to the highest ranking event and the ranks marked with a double asterisk (**) was found to be statictically significant ($\hat{\alpha} \leq .05$). The ranks were marked with a single asterisk (*) if this difference was found to be only marginally significant ($.05 < \hat{\alpha} \leq .1$). Thus, the results shown in Table VIII indicate the estimated preferential order of the proposed technology transfer aiding events. However, it should be noted that his estimated order could reasonably be expected to change if another series of interviews was to be conducted unless the difference between the ranks is shown to be statistically significant.

The results shown in Table VIII also indicate which of the ranks assigned to the events differs statistically from that assigned to the highest ranked event. It can be seen that this difference for the lowest ranked event is statistically significant for eight of the demographic groupings, and the difference is marginally significant for two of the demographic groupings. The level of significance increases when the differences between the rank assigned to the highest ranked event and the rank assigned to the second lowest ranked event are tested. For this case two of the differences are statistically significant, and two are marginally significant. Only two demographic groups ranked the events so that the differences are marginally significant for the third lowest ranked event, and none of the groups ranked the events such that the difference is significant for the second highest ranked event.

The above results indicate that the personnel interviewed perceived that the ADTP assessment policy will most likely encourage the following two events: (1) "establishing an early informational linkage" between the laboratories and the product divisions and (2) "strong product division support" of a technology. A review of the subjective comments received during the interviews suggests that an "early informational linkage" will result from better communication and dialogue between the laboratories and the product divisions. This aspect of the assessment process is discussed in the "Communication and Dialogue" section of this chapter. The subjective comments also suggest that "strong product division support" will result from two factors: (1) a formal acknowledgement of a product division need and (2) resolving disagreements within the product division which thus creates a single spokesman for the product division.

The findings regarding the ranks assigned to the event "planning activities which may expose problems" are less conclusive. The rank assigned to this event did not differ statistically from those assigned to either the highest or the lowest ranked events. However, the mean of the ranks tends to be closer in value to the mean of the ranks assigned to the lowest ranked event.

The analysis also showed that the two least likely events to be encouraged were perceived to be as follows: (1) "establishing that the technology is sufficiently mature" and (2) "providing a forum for problem resolution." The subjective comments suggest that some personnel feel that the product divisions do not have enough time to review the technology to determine if it is mature. Also, some of the people interviewed suggested that establishing that the technology is mature sometimes becomes a subjective process. The recognition of these factors by the personnel

interviewed could have resulted in the lower ranks assigned to this event. The personnel interviewed offered no subjective comments regarding the "provide a forum" event.

When the above findings are considered in the context of the findings of research efforts discussed in Chapter II, it can be concluded that the balance between the push of technology and the pull of the product division need is likely to be enhanced by the assessment process. The Project Hindsight team concluded that in the majority of the technological events transferred to weapon systems that the need was first established by the applications engineering group (ODDR&E, 1969:47). Furthermore, the comments made by the Syracuse Research Corporation study group indicate that the most successful cases of technology transfer occurred when a problem solution was being sought and that the balance between push and pull was accomplished by an early informational linkage (Teich, 1974:42, 43).

Difference Between Demographic Groupings. The statistical hypothesis that there tends to be no difference between the responses given by the various demographic groups in answer to this question was tested using the Smirnov two-sample test identified in Chapter III. This test was performed for each of the five technology transfer aiding events, and the responses obtained from two demographic groupings were compared during each test. In all, six different pairs of demographic groupings were considered: (1) All Laboratory and All Product Division, (2) Laboratory A and Laboratory B, (3) Product Division Organization A and Product Division Organization B, (4) GS-15 Lt Col & Above and GS-14 Maj & Below, (5) Over 20 Years and Under 20 Years, and (6) More Than 2 Years and Less Than 2 Years. The combination of the six pairs of demographic groupings and five aiding events resulted in thirty separate statistical hypotheses

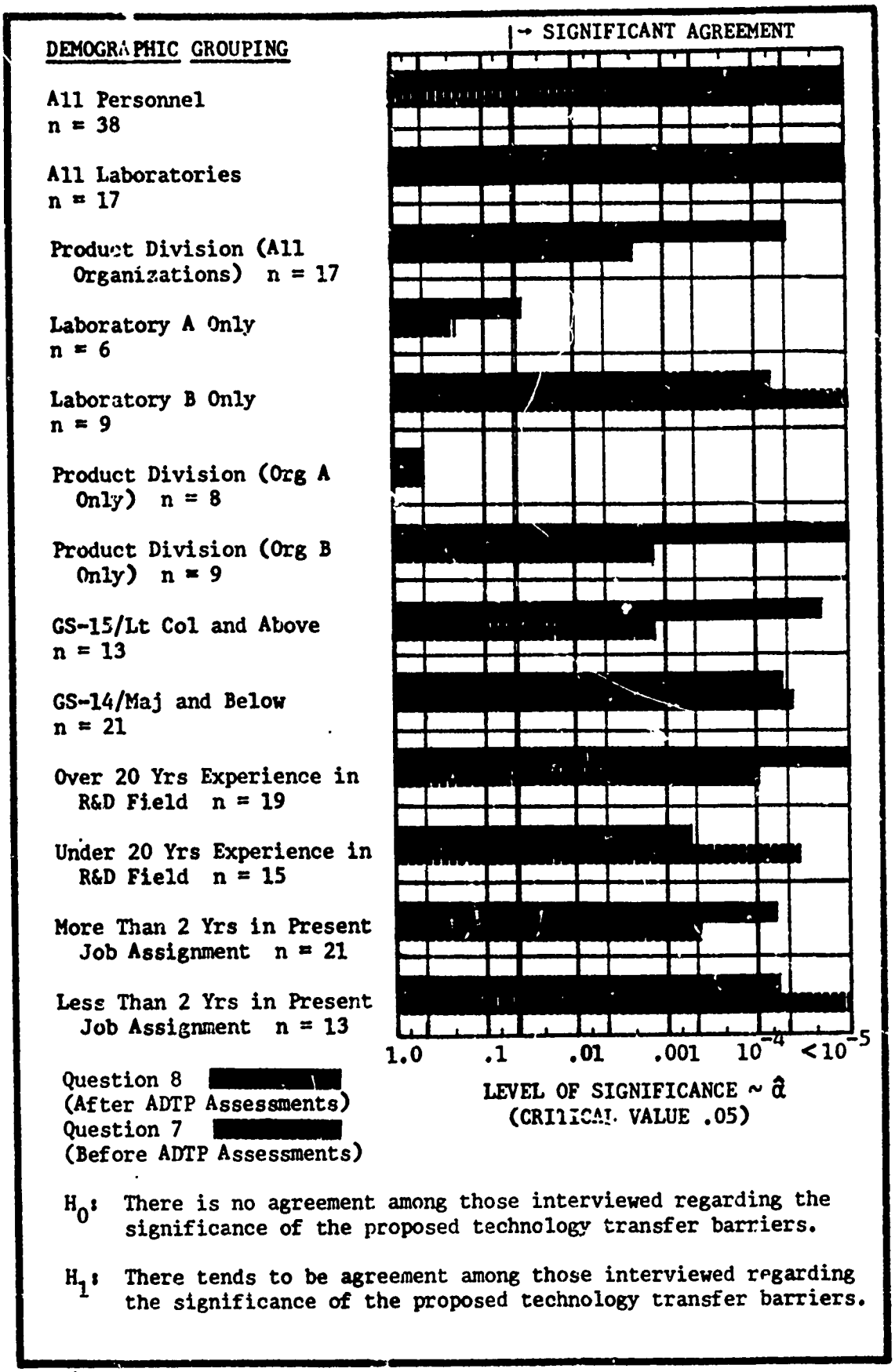
being tested. A significant difference between the responses given was not found for any of the thirty combinations considered. It is felt that this finding corroborates the finding that there is agreement among those interviewed regarding which events are likely to be encouraged by the assessment policy.

Technology Transfer Barriers (Questions 7 and 8)

General. The proposed barriers to technology transfer that those interviewed were asked to consider are defined in Table II (see Chapter III). The variation in mean responses to these questions suggests that the personnel interviewed perceived that the proposed barriers to technology transfer are not equally significant for both conditions--before and after the ADTP assessment policy went into effect. Moreover, a decrease in the mean responses was observed, and this suggests that the assessment process was perceived to reduce the significance of the barriers.

Perception of Barriers

Agreement. Overall there tends to be agreement among those interviewed regarding the perceived significance of the technology transfer barriers. Also, there generally tends to be agreement among the personnel within each of the demographic groupings considered. These findings result from testing the statistical hypotheses shown in Figure 6. This figure is constructed in the same manner as Figure 5, and the level of significance ($\hat{\alpha}$) values were determined from the coefficient of concordance test. The broken bars represent the value of $\hat{\alpha}$ computed for the response to Question 7 (before ADTP assessments); the solid bars represent the values of $\hat{\alpha}$ computed for the response to Question 8 (after ADTP assessments).



H_0: There is no agreement among those interviewed regarding the significance of the proposed technology transfer barriers.

H_1: There tends to be agreement among those interviewed regarding the significance of the proposed technology transfer barriers.

Figure 6. Results of Coefficient of Concordance Tests--Technology Transfer Barriers (Questions 7 & 8)

The results shown in Figure 6 indicate that the personnel assigned to laboratory A did not exhibit significant agreement regarding the ranking of the technology transfer barriers when the conditions that were perceived to have existed before the ADTP assessment policy went into effect were considered. The mean of the ranks assigned to the proposed barriers are listed in Table F-II as 6.67, 4.83, 4.75, 4.50, 4.25, 4.00, 4.00, and 3.00. It can be seen that except for the largest and smallest of these ranks the values are grouped near the center of the ranking scale. In fact, the average difference between the mid-ranks is only .17. This value can be contrasted with the value of .67 obtained when the same computations are performed using the mean of its ranks assigned by the laboratory B personnel who did exhibit agreement regarding the ranking of the barriers. Thus, the lack of agreement can be attributed to disagreement in the ranking of the barriers associated with the six mid-ranks listed above.

The results shown in Figure 6 also indicate that personnel assigned to the product division organization A did not agree on the ranks assigned to the proposed technology transfer barriers. An analysis similar to that performed for the laboratory A personnel reveals that the disagreement is also with respect to the ranks as assigned to the mid-ranked barriers. The average difference in the ranks assigned to these mid-ranks was the same (.24) for both the before and after conditions.

As a final comment on those demographic groupings which failed to agree on the ranking of the technology transfer barriers, note that the same two groupings failed to agree on the ranking of the technology transfer aiding events. It is felt that this fact supports the recommendation of further study discussed in the section entitled "Technology Transfer Aiding Events."

Significance of Barriers. Estimates of the perceived significance of the eight technology transfer barriers were made by assigning ranks to those barriers as described in Chapter III (see Table III). The ranks assigned to the barriers are shown in Tables IX and X. Table IX shows the values assigned for the conditions perceived to exist before the ADTP assessments, and Table X shows the values assigned for the conditions perceived to exist after the ADTP assessments. These tables are constructed in the same manner as Table VIII. A table entry of "8" indicates the barrier ranked the most significant, and an entry of "1" indicates the barrier ranked the least significant. The barriers are listed in order of decreasing significance as determined by the mean ranks assigned by the All Personnel demographic grouping. Thus, the results shown in Tables IX and X indicate the estimated preferential order of the barriers assigned by the various demographic groups. However, it should be noted that the estimated order shown might well change if another series of interviews was to be conducted unless the difference between the ranks is shown to be statistically significant. The level of significance is shown by asterisks as noted in the tables.

When the conditions perceived to exist before ADTP assessments (Table IX) are considered, it can be seen that the difference between the rank assigned to the highest ranked barrier and that assigned to the lowest ranked barrier was found to be statistically significant for ten of the demographic groupings and marginally significant for one demographic grouping. The level of significance increases when the second and third lowest ranked barriers are compared to the highest ranked barrier, and it can be seen that none of the demographic groups ranked the barriers so that the difference is significant for the fourth lowest ranked barrier.

TABLE IX

RANKS ASSIGNED TO TECHNOLOGY TRANSFER BARRIERS

(BEFORE ADTP ASSESSMENTS)

Rank Assigned By:	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Inertia Barriers	8	8	6		7		5.5	8	7.5	8	5	8	5
Transfer Management Structure	7	7	5		8		3	6	7.5	6.5	7	5	8
Time Barriers	6	6	8		6		8	7	6	6.5	6	7	7
Communication Barrier	5	4	7		5		7	5	5	4	8	6	4
Cost Barriers	4	5	3		4		5.5	4	4	5	4	3	6
Lack Of Incentive Structure	3	3*	4		3*		4	2	3	3*	3	4	3
Technology Barriers	2**	2**	2		2**		2	3	2	2*	2	2*	2**
Geographic Distance	1**	1**	1*		1**		1**	1**	1**	1**	1**	1**	1**

No Significant Agreement

No Significant Agreement

** Difference from highest ranked barrier is statistically significant ($\hat{\alpha} \leq .05$).

* Difference from highest ranked barrier is marginally significant ($.05 < \hat{\alpha} \leq .1$).

TABLE X

RANKS ASSIGNED TO TECHNOLOGY TRANSFER BARRIERS

(AFTER ADTP ASSESSMENTS)

Rank Assigned By	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Inertia Barriers	8	8	6	8	7		5	8	7	8	8	8	7
Time Barriers	7	7	8	7	8		8	6	8	7	7	7	8
Cost Barriers	6	6	7	5	5	No Significant Agreement	7	7	6	6	5	6	6
Lack Of Incentive Structure	5	4**	5	3	4		6	4	5	5	6	5	5
Transfer Management Structure	4*	5	4	2	6		4	5	4	5	3	4	4
Communication Barriers	3**	3**	3	6	1**		3	3**	3*	3**	4	3*	3*
Technology Barriers	2**	2**	2	1	3		2*	2**	2**	1**	2	2**	2**
Geographic Distance	1**	1**	1**	4	2*		1**	1**	1**	2**	1**	1**	1**

** Difference from highest ranked barrier is statistically significant ($\hat{\alpha} \leq .05$).

* Difference from highest ranked barrier is marginally significant ($.05 < \hat{\alpha} \leq .1$).

The results, shown in Table X (after ADTP assessments), follow the same general pattern as those shown in Table IX. However, it can be seen that for these conditions the differences obtained for the third lowest ranked barriers are more significant than those obtained for the conditions perceived to exist before ADTP assessments. Five of the third lowest ranked barriers were found to be statistically different from the highest ranked barrier. Whereas for the condition perceived to exist before the ADTP assessments the third lowest ranked barriers were found to be marginally different from the highest ranked barrier.

The above results indicate that the personnel interviewed perceived "inertia barriers," "time barriers," and "cost barriers" to be more significant than "technology barriers" and "geographic distance." This perception is true for the conditions perceived to exist both before and after the ADTP assessment policy went into effect. The subjective comments received during the interviews suggest that the higher perceived significances of the first three barriers may be due to the performance, schedule, and cost tradeoffs that must be made during the weapon system acquisition process. The following excerpts from these comments illustrate this suggestion.

> 1. The SPO director is the big factor [with respect to using an ADTP generated technology]. It depends on how he sees the risk involved, the cost, and schedule impact.
>
> 2. The labs do not necessarily have all the solutions; in fact, the contractors will stress a solution which may have a little less performance and risk, but is a lot cheaper.
>
> 3. The time barrier is important. The technology window is pretty narrow sometimes.

The comments offered regarding "technology barriers" generally expressed the idea that program authorization and budgeting coordination cycles

will eliminate those ADTPs that are not supported by a suitable technology base. The availability of the telephone was usually cited as the reason for "geographic distance" being ranked low.

The findings regarding the barrier "lack of incentive structure" are less conclusive. This barrier was generally ranked as being marginally different from the highest ranked barrier for the conditions perceived to exist before ADTP assessments went into effect but was ranked as not being different for the conditions perceived to exist after ADTP assessments went into effect. This increase in the ranking may be due to the decrease in the ranks assigned to "transfer management structure" and "communication barriers."

Effect of ADTP Assessments. The decrease in the ranks assigned to "transfer management structure" and "communication barriers" are an indication that the personnel interviewed perceived that the assessment process will strongly affect these two barriers. This indication is corroborated by the results obtained from using the sign test (see Chapter III). The null hypothesis that the barriers were perceived to be less significant before the ADTP assessment policy went into effect was tested using the responses from the All Personnel demographic grouping. The results of this test indicate the perceived effect of ADTP assessments on the technology transfer barriers and are shown in Table XI.

Table XI is constructed such that the entries in the first three table columns are the number of personnel who perceived that a given barrier was less significant before ADTP assessments, less significant after ADTP assessments, and of the same significance for both before and after the ADTP assessments. The entries in the last table column are values computed for the level of significance using the conservative approach

TABLE XI

EFFECT OF ADTP ASSESSMENTS

ON TECHNOLOGY TRANSFER BARRIERS

Barrier Was Less Significant:	Before ADTP Assessments	After ADTP Assessments	No Change In Significance	Conservative Level Of Significance
Inertia Barriers	4	13	21	.983
Time Barriers	2	13	23	.983
Cost Barriers	2	13	23	.983
Lack of Incentive Structure	3	15	20	.928
Transfer Management Structure	2	24	12	.072
Communication Barriers	0	25	13	.037**
Technology Barriers	1	12	25	.993
Geographic Distance	1	6	31	≈ 1.0

** Reject Null Hypothesis

described in Chapter III. The table rows are the proposed barriers to technology transfer.

The results shown in Table XI indicate that the null hypothesis stated above can be rejected at significant levels less than .05 for "communication barriers." Thus, it can be concluded that the personnel interviewed generally perceived that this barrier was more significant prior to establishing the ADTP assessment policy than after. Also, note that the null hypothesis can be rejected at a significant level of .072 for "transfer management structure." The results shown in Table XI also clearly indicate that the null hypothesis cannot be rejected for the remaining six proposed barriers. Furthermore, the number of people who indicated that they perceived no change in the significance of the barriers is larger than the number who indicated that the barrier was less significant before ADTP assessments. Therefore, these results suggest that those interviewed perceived that the assessment process would not affect the significance of the remaining six barriers.

Recommendation. The above results indicate that the ADTP assessment process was not perceived to significantly affect six of the proposed barriers to technology transfer. It is therefore recommended that research on these barriers to technology transfer be continued. A follow-on thesis effort could be devoted to a study of the three barriers considered to be the most significant. Such an effort might lead to a better understanding of the chief characteristics of these barriers.

Difference Between Demographic Groups. The statistical hypothesis that there tends to be no difference between the responses given by the various demographic groups in answer to Questions 7 and 8 was tested. The Smirnov two-sample test was used in performing this

analysis, and the procedure followed was the same as that used in performing two-sample tests when analyzing the responses obtained in answer to Question 6. The two instances found for which a significant difference exists in the response to these questions are summarized in Table XII.

The values for the level of significance shown in Table XII indicate that the laboratory and product division personnel tend to give statistically different answers for "lack of incentive structure" in response to Question 7, but not in response to Question 8. The means of the responses given for each of the groups are also shown in Table XII for both Questions 7 and 8. These values indicate that the laboratory personnel feel that this barrier is less significant than the product division personnel. Moreover, the values of the difference in the mean responses are less for Question 8 than for Question 7. This indicates that the product division personnel generally felt that the assessment process would reduce the significance of this barrier more than the laboratory personnel did.

The results shown in Table XII also indicate that the personnel working in laboratory A and laboratory B were found to have given different responses regarding the barrier "transfer management structure." Moreover, this difference was not found to be significant for the responses to Question 8. These differences and the fact that the means of the responses given by the laboratory A personnel are less than the means of those given by the laboratory B personnel suggest that the barrier was perceived to be less significant to the personnel working in laboratory A.

Communication and Dialogue

The analysis of the responses to the questions regarding technology

TABLE XII

SIGNIFICANT DIFFERENCES BETWEEN

RESPONSE TO QUESTIONS 7 AND 8

Technology Transfer Barriers	Demographic Groupings Mean Responses		Difference Between Mean Responses	Level of Significance (α) Question 7	Question 8
Lack of Incentive Structure	Lab and P.D.				
Mean Response Ques. 7	3.35	5.18	1.83		
Mean Response Ques. 8	2.94	4.47	1.53	.016	.245
Transfer Management Structure	Lab A and Lab B				
Mean Response Ques. 7	3.33	5.89	2.56		
Mean Response Ques. 8	2.67	4.11	1.44	.014	.176

transfer revealed that the personnel interviewed perceived that the ADTP assessment process would affect communication and dialogue between the laboratories and the product division. It was found that the event "establish early information linkage" was perceived likely to be encouraged by the assessment process. Moreover, it was found that the personnel perceived that the assessment process would reduce "communication barriers." The data analyzed in this section of the thesis were obtained from questions designed to further investigate laboratory and product division communication and dialogue. Interview Questions 9, 10, 11, 12, 13, and 14 were devoted to this end and were designed to measure four specific factors: advanced development program visibility, an individual's communication pattern, adequacy of expected communication, and anticipation of increased dialogue. The development of these questions is presented in Chapter III under the section entitled "Communication and Dialogue."

Program Visibility (Questions 9 and 10)

General. The degree of visibility of ADTPs that can be attributed to the assessment process was measured through interview Questions 9 and 10.

> Question 9: Below is a list of advanced development programs/projects either being considered or currently ongoing in the laboratories. Please place a check mark beside a program/project if you learned of it because of the ADTP assessment policy/activity.
>
> Question 10a: Can you think of any other advanced development programs/projects that you now know about but probably would not have learned of if the ADTP assessment policy/activity had not occurred?
>
> Question 10b: If more than one, about how many?

Seven of the thirty-eight personnel interviewed did not answer these two questions. Six of those who did not answer were laboratory personnel. The remaining person who did not answer was a member of the Other organization

category. The view generally expressed by the laboratory personnel who declined to answer these questions was that the questions should be answered only by product division personnel.

Findings. The results obtained from the answers to these two questions suggest that the assessment process does not vastly increase the visibility of ADTPs among laboratory and product personnel. Twelve (39%) individuals indicated that they had not heard of any of the ADTPs listed in Question 9 because of the assessment process (see Appendix D). Also, nineteen (61%) indicated that they had not heard of any ADTPs in addition to those listed in Question 9 because of the assessment process. Moreover, only four persons indicated that they had heard of more than four of the fifteen programs listed in Question 9 because of ADTP assessments, and only three persons indicated that they had heard of more than four additional programs in answer to Question 10b.

Possible Bias. The fact that the assessment process had been just recently established when the interviews were conducted most likely biased the results obtained from these two questions. Many of the ADTPs were ongoing when the assessment process was implemented; thus, people had the opportunity to learn of these programs by other means before the assessment policy was established. This prior knowledge would result in fewer programs being learned of because of the assessment process. Under these conditions, it is felt that the results obtained from Question 9 and 10 are likely to be biased toward more negative findings regarding the ability of the assessment process to make visible new advanced development technology programs (ADTPs).

Communication Pattern (Questions 11 and 12)

General. The effect of the ADTP assessment process upon an

individual's communication pattern was addressed through interview Questions 11 and 12.

> Question 11: What is your best estimate of the percent of your working time that was spent communicating with personnel in the agencies listed below regarding new ADTPs before the ADTP assessment requirement went into effect?
>
> Question 12: What is your best estimate of the percent of your working time that is or will be spent communicating with personnel in the agencies listed below regarding new ADTPs now that the ADTP assessment requirement is in effect?

The agencies listed were "higher headquarters," "product divisions," "laboratories," "AFLC," and "operational commands." Also, note that percentage estimates were only for communications regarding new ADTPs.

Two of the thirty-eight personnel interviewed did not answer these two questions. One person who did not answer was assigned to laboratory C, and one person was classified into the Other organization category.

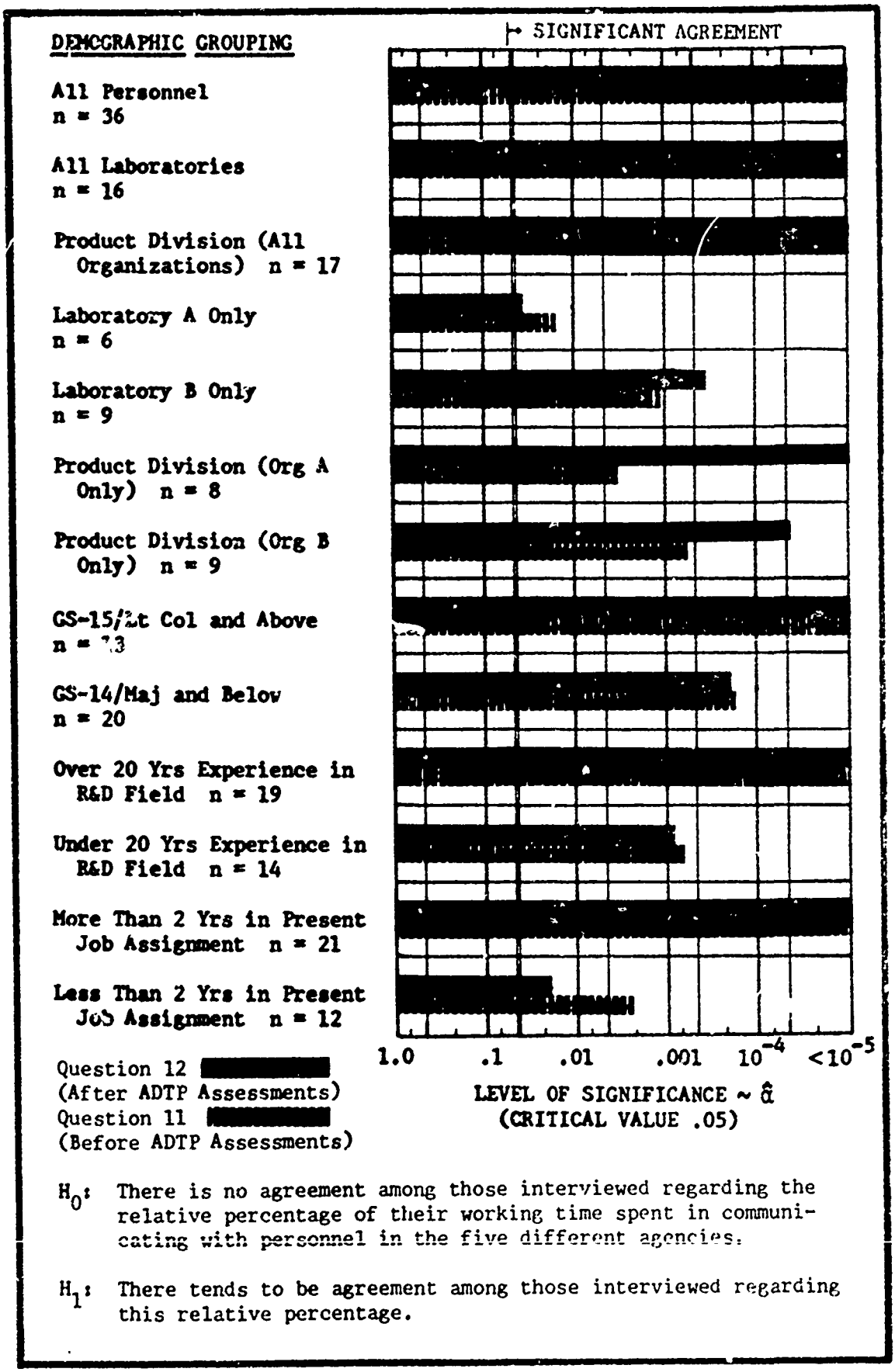
The interpretation of the percentages obtained in response to Questions 11 and 12 was modified as a result of the initial interviews. It was originally intended to use the values of the percentages of working time given in response to these questions as absolute percentages, but during the conduct of the trial interviews it was found that people had difficulty in estimating these percentages in absolute terms. The researcher therefore made it a practice to indicate that relative percentages would be acceptable as answers to these questions. These relative percentages were then used to assign ranks to the five agencies listed. The agency receiving the highest percentage was assigned the highest numerical rank, and the agency receiving the lowest percentage was assigned the lowest numerical rank. Also, the estimates of the relative percentages were used to identify whether communication with personnel in these agencies were perceived to have increased, stayed the same, or

decreased because of the assessment process. The result of this modification of the interpretation of the responses received in answer to these questions is that the same techniques used in analyzing the responses to Questions 7 and 8 are applicable to analyzing the response to the two questions.

Perception of Communication Time

Agreement. The null hypothesis of no agreement among those interviewed regarding the relative percentage of their working time spent in communicating with personnel in the five agencies was tested using the coefficient of concordance test. Each demographic grouping defined in Table V was considered. The level of significance computed for this test and the specific hypothesis tested are shown in Figure 7. This figure is constructed in the same manner as Figures 5 and 6. It can be seen that personnel in each of the thirteen demographic groupings tend to exhibit agreement in assigning the relative percentage of their working time spent in communicating with personnel in the five different agencies.

Preferred Order. Estimates of the true preferential order assigned to the five agencies by the various demographic groupings are shown in Tables XIII and XIV. These tables are constructed in the same manner as Tables VIII, IX, and X. Table XIII shows the values assigned for the conditions perceived to exist before ADTP assessments, and Table XIV shows the values assigned for the conditions perceived to exist after ADTP assessments. A table entry of "5" indicates the agency that the personnel interviewed perceived to spend the highest percent of their working time in communication with. A table entry of "1" indicates that the agency that the personnel interviewed perceived to spend the least amount of their working time in communication with.



H_0: There is no agreement among those interviewed regarding the relative percentage of their working time spent in communicating with personnel in the five different agencies.

H_1: There tends to be agreement among those interviewed regarding this relative percentage.

Figure 7. Results of Coefficient of Concordance Tests--Communication Time (Questions 11 & 12)

TABLE XIII

RANKS ASSIGNED TO AGENCIES

BASED ON AMOUNT OF COMMUNICATION TIME

(BEFORE ADTP ASSESSMENTS)

Rank Assigned By:	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Laboratories	5	3	5	4	2	5	5	5	4	5	4	5	3
Higher Headquarters	4	5	3**	5	5	4	3	3	5	3	5	3	5
Product Divisions	3	4	4	3	4	3	4	4	3	4	3	4	4
Operational Commands	2**	2	2**	2	3	2	2*	2**	2	2**	2	2**	2
AFLC	1**	1**	1**	1*	1**	1*	1*	1**	1**	1**	1**	1**	1**

** Difference from highest ranked agency is statistically significant ($\hat{\alpha} \leq .05$).

* Difference from highest ranked agency is marginally significant ($.05 < \hat{\alpha} \leq .1$).

TABLE XIV

RANKS ASSIGNED TO AGENCIES

BASED ON AMOUNT OF COMMUNICATION TIME

(AFTER ADTP ASSESSMENTS)

Rank Assigned By:	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Laboratories	5	3	5	3	3	5	5	5	5	5	5	5	4
Product Divisions	4	5	4**	4	5	4	4	4	4	4	4	4	5
Higher Headquarters	3	4	3**	5	4	3	3*	3	3	3	3	3	3
Operational Commands	2**	2	2**	2	2	2**	1**	2**	2	2**	2	2**	2
AFLC	1**	1**	1**	1*	1**	1**	2**	1**	1**	1**	1**	1**	1*

** Difference from highest ranked agency is statistically significant ($\hat{\alpha} \leq .05$).

* Difference from highest ranked agency is marginally significant ($.05 < \hat{\alpha} \leq .1$).

It should be noted that the estimated rank order of the agencies shown in Tables XIII and XIV might well change if another set of interviews was to be conducted, unless the difference between the ranks is shown to be statistically significant. The level of significance is shown by asterisks as noted in the tables.

When the conditions which existed before ADTP assessments (Table XIII) are considered, it can be seen that the difference between the rank assigned to the highest ranked agency and that assigned to the lowest ranked agency was found to be significant at the .05 level for ten of the demographic groupings. Moreover, this difference was found to be significant at the .1 level for the remaining three demographic groupings. The difference between the rank assigned to the second lowest ranked agency and that assigned to the highest ranked agency was found to be significant at the .05 level for five of the demographic groupings and significant at the .1 level for one demographic grouping. Only one demographic grouping ranked the agencies so that the rank assigned to the third lowest ranked agency was statistically different from that assigned to the highest ranked agency. None of the demographic groupings ranked the agencies so that the difference is significant for the second highest ranked agency.

When the conditions which existed after ADTP assessments (Table XIV) are considered, it can be seen that the results follow the same general pattern as those shown in Table XIII. However, it can also be seen that the differences between the ranks assigned to the highest ranked agency are generally more significant when these conditions are considered. Also, note that one demographic grouping (P.D.) ranked the agencies so that the difference between the ranks assigned to the highest agency and the second highest ranked agency was statistically significant.

The results shown in Tables XIII and XIV confirm the results expected by intuition. For the conditions perceived to exist both before and after ADTP assessments the "laboratories," "higher headquarters," and "product divisions" were ranked consistently high, and "operational commands" and "AFLC" were ranked consistently low. Thus, the personnel interviewed perceived that they spend more of their working time communicating about new ADTPs with personnel in "laboratories," "product divisions," and "higher headquarters" than they spend in communicating with personnel in "operational commands" and "AFLC."

Effect of ADTP Assessments. The null hypothesis that the personnel interviewed perceived that they spent more of their working time in communication with personnel in an agency regarding new ADTPs before the assessment policy went into effect was tested. This test was performed for each of the five agencies listed in Questions 11 and 12, and both organizational and nonorganizational demographic groupings were considered. The results obtained from these tests for the All Personnel, All Product Division Organizations, and All Laboratories demographic groupings are shown in Tables XV, XVI, and XVII respectively. It was found that the values of the level of significance computed for the nonorganizational demographic groupings were larger than the critical value. Thus, the null hypotheses could not be rejected for these tests. These results are therefore not tabulated.

The construction of Tables XV, XVI, and XVII is similar to that of Table XI. The entries in the first three columns of each table represents the number of personnel who perceived that the assessment process either has or will affect the communication between themselves and the agencies listed in the manner specified in the column headings.

TABLE XV

EFFECT OF ADTP ASSESSMENTS ON

COMMUNICATION TIME

(ALL PERSONNEL)

More Time Was Or Will Be Spent in Communication with the Agencies Listed Regarding New ADTPs:	Before ADTP Assessments	After ADTP Assessments	No Change	Conservative Level of Significance
Laboratories	3	16	17	.797
Product Divisions	1	20	15	.309
Higher Headquarters	4	9	23	.999
AFLC	0	8	28	.999
Operational Commands	0	10	26	.998

TABLE XVI

EFFECT OF ADTP ASSESSMENTS ON

COMMUNICATION TIME

(ALL PRODUCT DIVISION DIVISION PERSONNEL)

More Time Was Or Will Be Spent in Communication with the Agencies Listed Regarding New ADTPs:	Before ADTP Assessments	After ADTP Assessments	No Change	Conservative Level of Significance
Laboratories	1	13	3	.025**
Product Divisions	1	7	9	.834
Higher Headquarters	0	6	11	.928
AFLC	0	5	12	.975
Operational Commands	0	5	12	.975

** Reject Null Hypothesis

TABLE XVII

EFFECT OF ADTP ASSESSMENTS ON

COMMUNICATION TIME

(ALL LABORATORY PERSONNEL)

More Time Was Or Will Be Spent in Communication with the Agencies Listed Regarding New ADTPs:	Before ADTP Assessments	After ADTP Assessments	No Change	Conservative Level of Significance
Laboratories	2	2	12	≈1.0
Product Divisions	0	12	4	.038**
Higher Headquarters	4	2	10	≈1.0
AFLC	0	3	13	.999
Operational Commands	0	4	12	.998

** Reject Null Hypothesis

The entries in the fourth table column are the values computed for the level of significance when testing the null hypotheses stated above.

The results obtained from the before-and-after sign tests indicate that the personnel interviewed did in fact perceive that the assessment policy either has or will change their communication pattern. In order to perceive this finding the responses provided by laboratory and product division personnel must be considered separately. When the responses from all of the personnel interviewed are considered together, the results shown in Table XV indicate that the null hypothesis cannot be rejected. However, if the responses received from the product division personnel (Table XVI) and the laboratory personnel (Table XVII) are considered separately, the results indicate that the null hypothesis can be rejected for either the laboratory or product division agencies. The rejection of these hypotheses allows for the following conclusions: (1) the laboratory personnel interviewed perceived that more of their working time will be spent communicating about new ADTPs with product division personnel now that the assessment policy is in effect, and (2) the product division personnel interviewed perceived that more of their working time will be spent communicating about new ADTPs with laboratory personnel now that the assessment policy is in effect. Thus, the results indicate that the communication between the laboratory and product division personnel will be enhanced by the ADTP assessment process.

Difference Between Demographic Groups. The statistical hypothesis that there tends to be no difference in the responses given by the various demographic groupings in answer to Questions 11 and 12 was tested in the same manner that this hypothesis was tested for Questions 6, 7, and 8. Each agency was considered, and each of the six pairs

of demographic groupings defined earlier were considered. Five cases were found for which there were significant differences in the responses given by two demographic groupings. In each case, the demographic groupings which gave the responses were the All Laboratories and All Product Division Organizations. Furthermore, four of the differences in responses given in answer to Questions 11 and 12 occurred for the same two agencies--"higher headquarters" and "product divisions." The significant differences found are summarized in Table XVIII.

It can be seen from the results shown in Table XVIII that laboratory and product division personnel tend to give statistically different answers regarding the time spent communicating with personnel in "higher headquarters" about new ADTPs. Furthermore, the means of the responses suggest that laboratory personnel tend to communicate more with personnel in "higher headquarters" about new ADTPs than product division personnel. Also, note that this tendency was not perceived to be changed by the assessment process. The differences noted could be due to the fact that funding for new ADTPs comes from higher headquarters. Thus, laboratory personnel would be more inclined to communicate with these agencies regarding new ADTPs.

The results shown in Table XVIII also indicate that the laboratory and product division personnel tend to give statistically different answers regarding the time spent communicating with personnel in "product divisions" and "operational commands" about new ADTPs. The means of the responses suggest that the product division personnel tend to communicate more with people in "product divisions" than laboratory personnel, but that they tend to communicate less with people in "operational commands" than laboratory personnel. The difference in the responses is not significant at a reasonable level of significance for the conditions perceived to exist after

TABLE XVIII

SIGNIFICANT DIFFERENCES BETWEEN RESPONSES

TO QUESTIONS 11 AND 12

Agency	Demographic Groupings Mean Responses		Difference Between Mean Responses	Level of Significance Question 11	Level of Significance Question 12
	Lab . and	P.D.			
Higher Headquarters					
Mean Response Ques. 11	11.88	3.12	8.76	.0027	.0335
Mean Response Ques. 12	11.25	3.94	7.31		
Product Divisions					
Mean Response Ques. 11	5.38	9.94	4.56		
Mean Response Ques. 12	7.44	10.18	2.74	.0335	.0116
Operational Commands					
Mean Response Ques. 11	5.31	1.18	4.13	.0142	≈.6
Mean Response Ques. 12	6.88	1.82	5.06		

the ADTP assessment policy went into effect. This change in significance is due primarily to the fact that four product division personnel, who indicated zero percent in answer to Question 11, indicated that some percentage of their working time would be spent in communication with personnel in the "operational commands" in answer to Question 12.

Adequacy of Expected Communications (Question 13)

General. The adequacy of the amount of time that personnel will spend in communication with either laboratory or product division personnel regarding new ADTPs can be measured by considering the responses given in answer to Question 13.

> Question 13: How much of your working time should be spent communicating with personnel in the laboratory (product division) in order for you to stay aware of status of advanced development programs (systems) which are relevant to your job?

The responses given in answer to this question can be compared to appropriate responses given in answer to Question 12. For example, the percentage estimated by a person working in a laboratory in answer to this question can be compared to the percentage he estimated in Question 12 for "product divisions." When the responses are compared in this manner, inferences can be made regarding whether the personnel interviewed perceived that communication will be more or less than it should be. The same personnel who answered Questions 11 and 12 answered this question.

Findings. The statistical hypothesis that the personnel interviewed perceived that less time should be spent communicating than will be spent was tested using the sign test. The responses given by laboratory personnel and product division personnel were considered separately. Furthermore, the responses given by the personnel in each of the organizational subgroupings (see Table V) were also considered

TABLE XIX

ADEQUACY OF EXPECTED COMMUNICATION

The Personnel Interviewed Perceived That:	Less Time Should Be Spent Communicating	More Time Should Be Spent Communicating	Time Spent Communicating Is What It Should Be	Level of Significance Conventional Sign Test	Level of Significance Conservative Sign Test
Lab	4	10	2	.090	.227
Lab A	2	3	1	.500	.656
Lab B	2	7	0	.090	.090
P.D.	2	10	5	.019	.314
P.D. A	0	4	4	0	.637
P.D. B	2	6	1	.145	.245

separately. The results of these tests are shown in Table XIX.

Table XIX is constructed in essentially the same manner as Tables XV, XVI, and XVII. The table entries in the first three columns indicate the number of people who answered in the manner described by the table column heading. The values of level of significance computed are shown in the last two table columns. The level of significance values listed under the leading "Conventional Sign Test" were computed by discarding those responses which indicated the amount of time spent in communicating as being what it should (i.e., the ties). The level of significance values listed under the heading "Conservative Sign Test" were computed by considering the ties as discussed in Chapter III under the heading entitled "Data Reduction."

It can be seen from the results shown in Table XIX that the null hypothesis stated above cannot be rejected for any of the organizational groupings considered if the conservative values of the level of significance are accepted. However, note that the responses obtained tend toward the conclusion that the amount of communication will be less than it should be. Also, if the values computed using the conventional sign test are accepted, the null hypothesis can be rejected for the All Product Division Organizations and Product Division Organization A demographic groupings. The conclusion drawn from the above considerations is that the responses obtained tend to suggest that the personnel interviewed perceived that the amount of communication will be less than it should be; however, acceptance of the conclusion cannot be supported statistically.

Increased Dialogue (Question 14)

General. The anticipation of increased dialogue by laboratory and product division personnel was measured by interview Question 14.

Question 14: Do you think that the ADTP assessment policy will improve the dialogue between yourself and the product division (laboratory)?

All laboratory and product division personnel interviewed answered this question; however, one individual in the Other organization category did not. Two answer choices were provided--"yes" and "no." The responses given in answer to this question were analyzed by constructing confidence intervals for the percentage of "yes" responses and by contingency table tests.

Findings. The histogram shown in Appendix D indicates that thirty-one (83.8%) of the personnel interviewed answered "yes" to this questions. This suggests that, in general, those interviewed perceived that the assessment policy will improve the dialogue between themselves and personnel in the counterpart agencies. However, it was felt that additional information could be obtained regarding the issue addressed by Question 14 if the data were to be examined in more detail. Accordingly, 95% confidence intervals for the percentage of "yes" responses were computed. All of the organizational and nonorganizational demographic groupings were considered. Confidence intervals were not computed using the responses given by the suborganizational demographic groupings (i.e., Laboratory A, Laboratory B, etc.) because of the small size of these groupings. The results of these computations are shown in Figure 8. A linear-percent scale is used to plot the results, and the length of the bar represents the length of the confidence interval. The bar begins at the lower bound of the estimate for the percentage of personnel who will answer "yes" and extends to the upper bound for the estimate of this percentage.

It was found that the laboratory personnel tend to be more negative in their answers to this question than the product division per - 1.

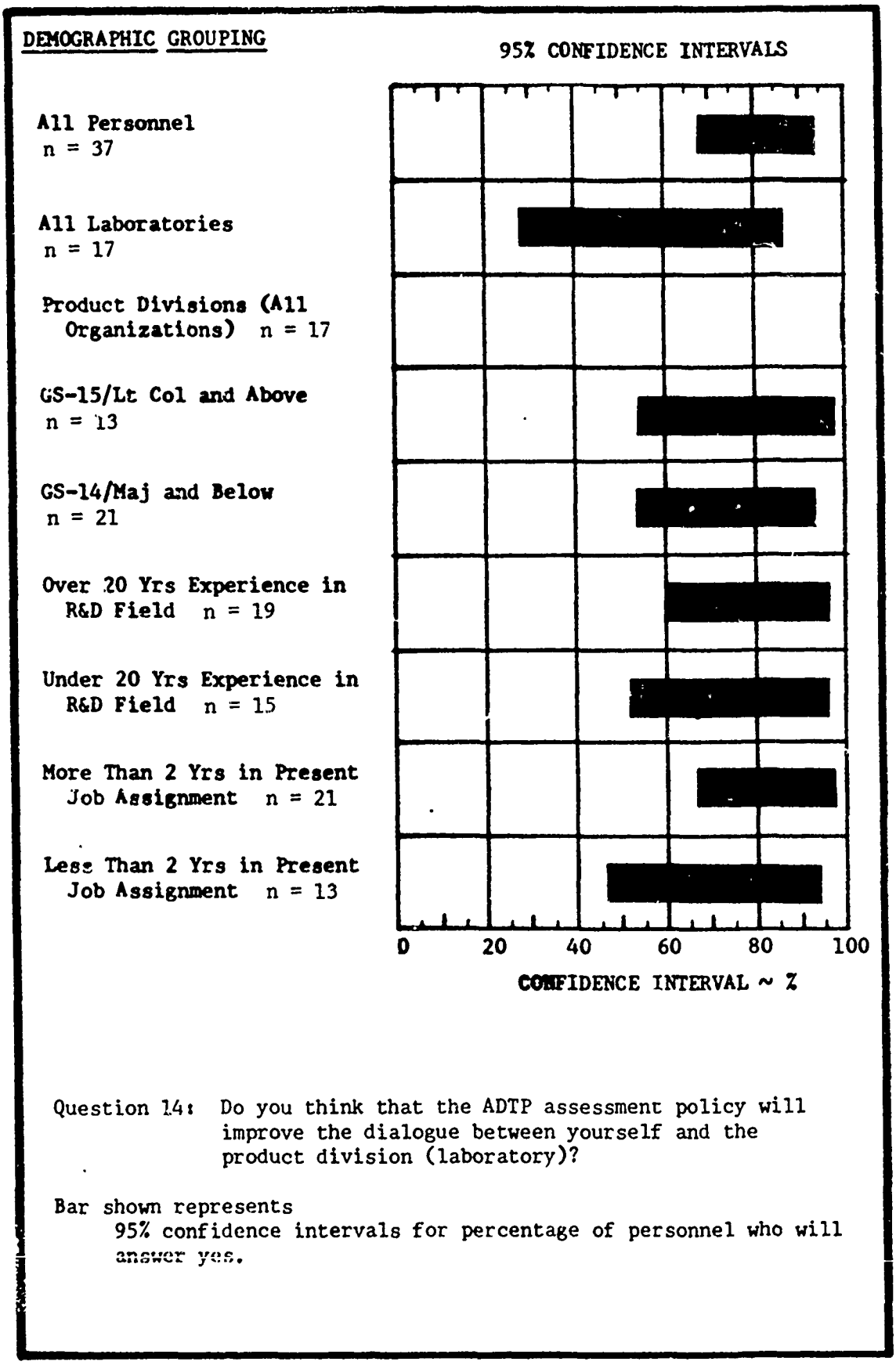


Figure 8. 95% Confidence Intervals--Question 14

The results shown in Figure 8 indicate that the interval computed for the laboratory personnel extends between 28% and 88%, and the interval for the product division personnel is a single point (100%). All seventeen of the product division personnel interviewed answered "yes." Furthermore, the difference between the responses given by the laboratory and product division personnel was found to be statistically significant ($\hat{\alpha}$ = .007) using the contingency table analytical technique.

The subjective comments provided by the laboratory personnel who answered "no" to Question 14 were reviewed in order to determine if these personnel expressed a consensus of opinion. The comments provided by these personnel are listed below.

> 1. Our communications with the product division personnel is [sic] very good now. The new policy may work if the product division players are not changed. If so, the communications channels will remain the same [as they are now].
>
> 2. I haven't found the development planners particularly informative on what the real needs are in the product divisions.
>
> 3. It has served to make everyone defensive.
>
> 4. There should be extensive dialogue with the product division, but I disagree with the current assessment policy.

It can been seen that three different opinions are expressed by these comments. (1) Existing channels for dialogue, which bypass the development planning organization, are sufficient. (2) Assessments will make laboratory personnel more defensive regarding their programs. (3) The concept of ADTP assessment is not desirable.

Upon further review of the data it was also found that the Laboratory A and Laboratory B personnel tended to give different answers in response to this question. Four of the six Laboratory A personnel answered

"no" to the question; whereas two of the nine Laboratory B personnel answered "no." This difference in the responses was found to be significant at the .085 level using the contingency table test. Thus, it appears that the difference between the laboratory and product division personnel responses may be attributed to the answers given by the Laboratory A personnel. It is felt that this finding might indicate a negative reaction to the assessment process because the Laboratory A personnel interviewed were more closely involved with the in-depth assessment process than the Laboratory B personnel interviewed. However, the reader is reminded that this inference is based upon interviews with only six Laboratory A personnel. It should therefore be validated by further research before being accepted.

The subjective comments offered by the product division personnel illustrate one practice which might degrade the effectiveness of the assessment process. Three different individuals raised the issue that within a given office the assessment might be accomplished by only one person. Furthermore, the point was raised that an annual reassessment might be accomplished by an individual who did not perform the orignial assessment and that the new assessor may or may not be familiar with the conclusions reached during the first assessment. It is not known if this situation is pervasive throughout the product division organizations since only a small number of people were interviewed. However, if this situation does occur often, it could result in inconsistent assessments and would most likely result in less than the desired visibility of laboratory programs within the product division.

Recommendation. It is recommended that the possibility of the above situations be recognized and, if required, that action be taken

to minimize the negative aspects of one-person-assessments within an office. One action that could be taken is to insure that the results of the assessments are disseminated among the office personnel. Also, an office case file could be established for each laboratory program assessed. These files would provide a record of all past comments and data considered and could be referenced when performing future assessments.

Assessment Tasks

The personnel interviewed were asked to give their perception of key assessment tasks in Questions 15 and 16. Laboratory personnel answered Question 15, and product division personnel answered Question 16. Each question contained two parts. In the first part of the questions those interviewed were asked to give their perception of the difficulty of accomplishing the assessment tasks, and in the second part they were asked if they thought that product divisions have enough time and manpower to devote to the assessment tasks. The development of these questions is discussed in Chapter III under the section entitled "Assessment Tasks."

Difficulty of Assessment Tasks (Questions 15a and 16a)

General.

Questions 15a and 16a were stated as follows:

> Question 15a: If you work in a laboratory, how difficult is it (or "would it be") for you to obtain what you feel is reliable information on each of the following items to include in the technology program plan?
>
> Question 16a: If you work in a product division, how difficult is it (or "would it be") for you to perform what you feel is a reliable assessment of an ADTP with respect to each of the following items?

The "items" listed were "payoff," "schedules," "ADTP cost estimates," "priority," and "alternate approaches/decision options."

All of the personnel interviewed answered either one or the other of these questions. However, since the questions addressed the

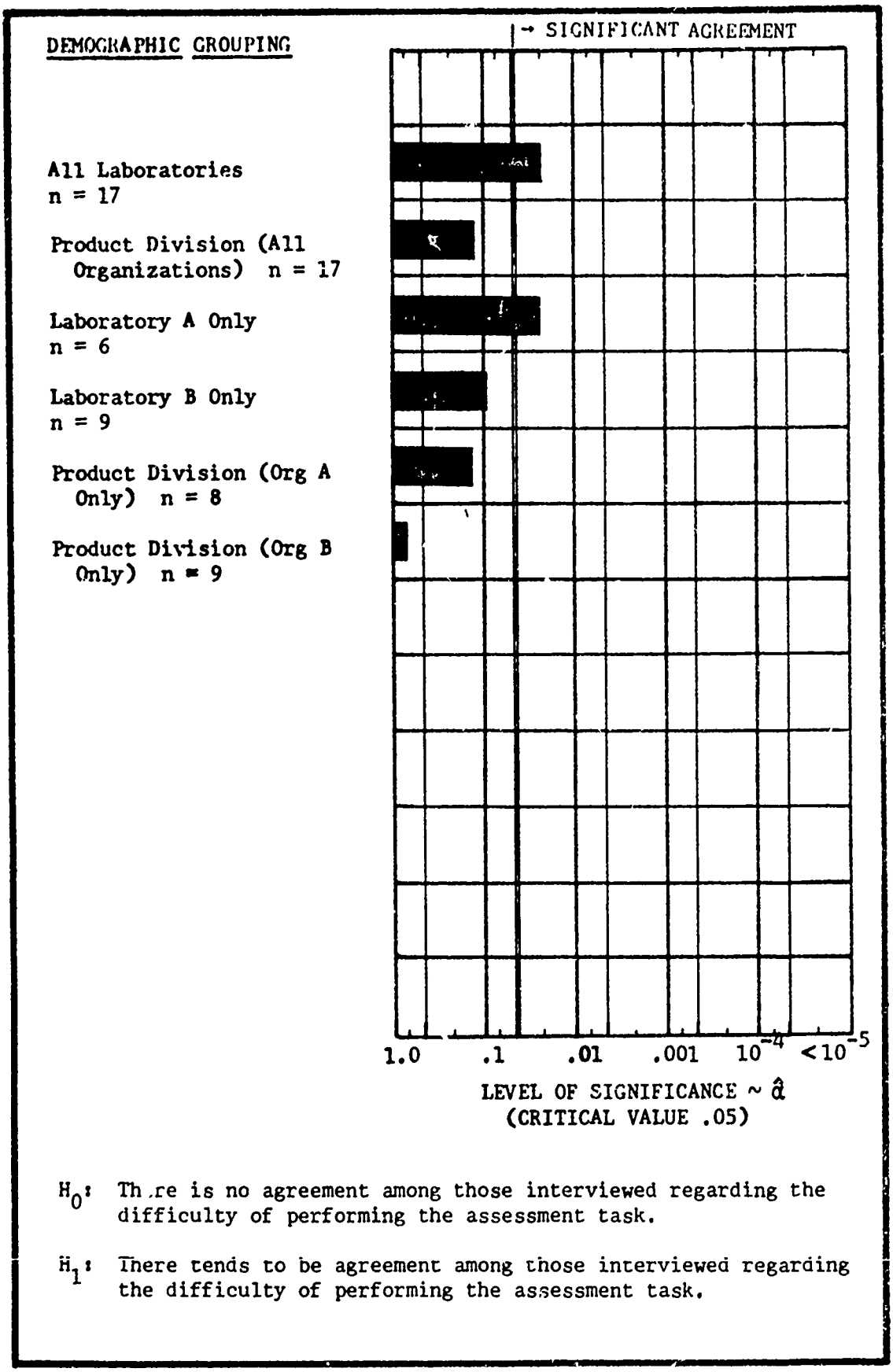
assessment task from an organization-specific perspective, the nonorganizational demographic groupings were not considered in the analysis. The All Personnel demographic grouping also was not considered for the same reason.

Perception of Task Difficulty

Agreement. The null hypothesis of no agreement among those interviewed regarding the difficulty of the assessment task was tested using the coefficient of concordance test. The results of the test performed are shown in Figure 9. This figure is constructed in the same manner as Figure 5.

It can be seen from the results shown in Figure 9 that the laboratory personnel interviewed tended to be in better agreement regarding the difficulty assigned to the assessment task than the product division personnel. The level of significance for the All Laboratory and Laboratory A demographic groupings was found to be less than the level of significance for the product division demographic groupings. The personnel assigned to Product Division Organization B were also found to be in less agreement regarding the difficulty of the assessment task than the other personnel interviewed.

Preferred Order. Estimates of the true preferential order assigned to the five tasks by the two demographic groupings which did exhibit agreement in the rankings are shown in Table II. It can be seen that, overall, the laboratory personnel interviewed perceived that obtaining information regarding "payoff" and "schedules" was less difficult than obtaining information regarding the other tasks. However, note that the difference in the ranks assigned is only significant at the .1 level.



H_0: There is no agreement among those interviewed regarding the difficulty of performing the assessment task.

H_1: There tends to be agreement among those interviewed regarding the difficulty of performing the assessment task.

Figure 9. Results of Coefficient of Concordance Tests--Difficulty of Assessment Tasks (Questions 15a & 16a)

TABLE XX

RANKS ASSIGNED TO KEY ASSESSMENT TASK

(MOST DIFFICULT (5) TO LEAST DIFFICULT (1))

Ranks Assigned By:	Lab	Lab A	Lab B	P.D.	P.D. A	P.D. B
Priority	5	5	No Significant Agreement	No Significant Agreement	No Significant Agreement	No Significant Agreement
ADTP Cost Estimaces	4	3				
Alternate Approaches/ Decision Options	3	4				
Payoff	2*	1*				
Schedules	1*	2				

* Difference from the task ranked most difficult is marginally significant ($.05 < \hat{\alpha} \leq .1$).

Problem Areas. The responses given for the task that tended to be ranked higher in difficulty do not indicate that the personnel interviewed perceived that the accomplishment of these tasks is a significant problem area. Four laboratory personnel indicated that obtaining information regarding the priority of a program was "virtually impossible," but the mean response (see Table F-VI) was 3.00. This suggests that, overall, these personnel perceived that obtaining information regarding priority was "somewhat difficult." Similar results are noted when the task of obtaining information regarding "ADTP cost estimates" is considered. The mean of the responses given for this task is 3.65, and thus also fell within the "somewhat difficult" classification. The mean of the response given by the product division personnel regarding the task of assessing "ADTP cost estimates" also fell within the "somewhat difficult" category (3.24; see Table F-VII).

The above conclusion is corroborated by the fact that five of the six demographic groupings considered failed to exhibit agreement regarding the relative ease or difficulty of accomplishing the assessment tasks. It is felt that if a significant problem existed in accomplishing the assessment tasks, then agreement would have been found as a result of these tests.

Product Division Time and Manpower (Questions 15b and 16b)

General. Questions 15b and 16b were both stated as follows:

> Questions 15b and 16b: Do you think that the product divisions have enough time and manpower to devote to the assessment process?

These two questions were formulated because of recommendations received during trial interviews. Therefore, only the thirty-four personnel interviewed after the trial interviews were asked these questions. Two answer choices were provided--"yes" and "no."

These questions do not address the issue of product division time and manpower availability from an organization-specific perspective. Thus, the nonorganizational demographic groupings were considered in the analysis. The same analytical techniques used to analyze Question 14 responses were used to analyze the responses given in answer to these questions.

Findings. The responses given in answer to these questions suggest that the personnel interviewed perceived that the product division will have enough time and manpower to devote to the assessment process. This finding is based upon a consideration of the 95% confidence intervals computed for the percentage of personnel who will answer "yes" to these questions. These confidence intervals are shown in Figure 10. This figure is constructed in the same manner of Figure 8, and it can be seen from the results shown that the confidence intervals fall decidedly above the median value of 50% for the All Personnel and GS-15 Lt Col and Above demographic groupings. Also, the lower bound of the confidence interval falls near the value of 35% for six of the demographic groups, and the corresponding value of the upper bound of the confidence interval falls near the value of 85%.

The subjective comments received as a result of these questions suggest that the product division personnel think that performing the assessment is an important function and that time should be made available to accomplish the task. These comments also suggest that some personnel feel that they cannot devote as much time to the assessments as they would prefer. The following excerpts illustrate their views:

1. Time has to be made available. We can't afford not to do the assessments properly.

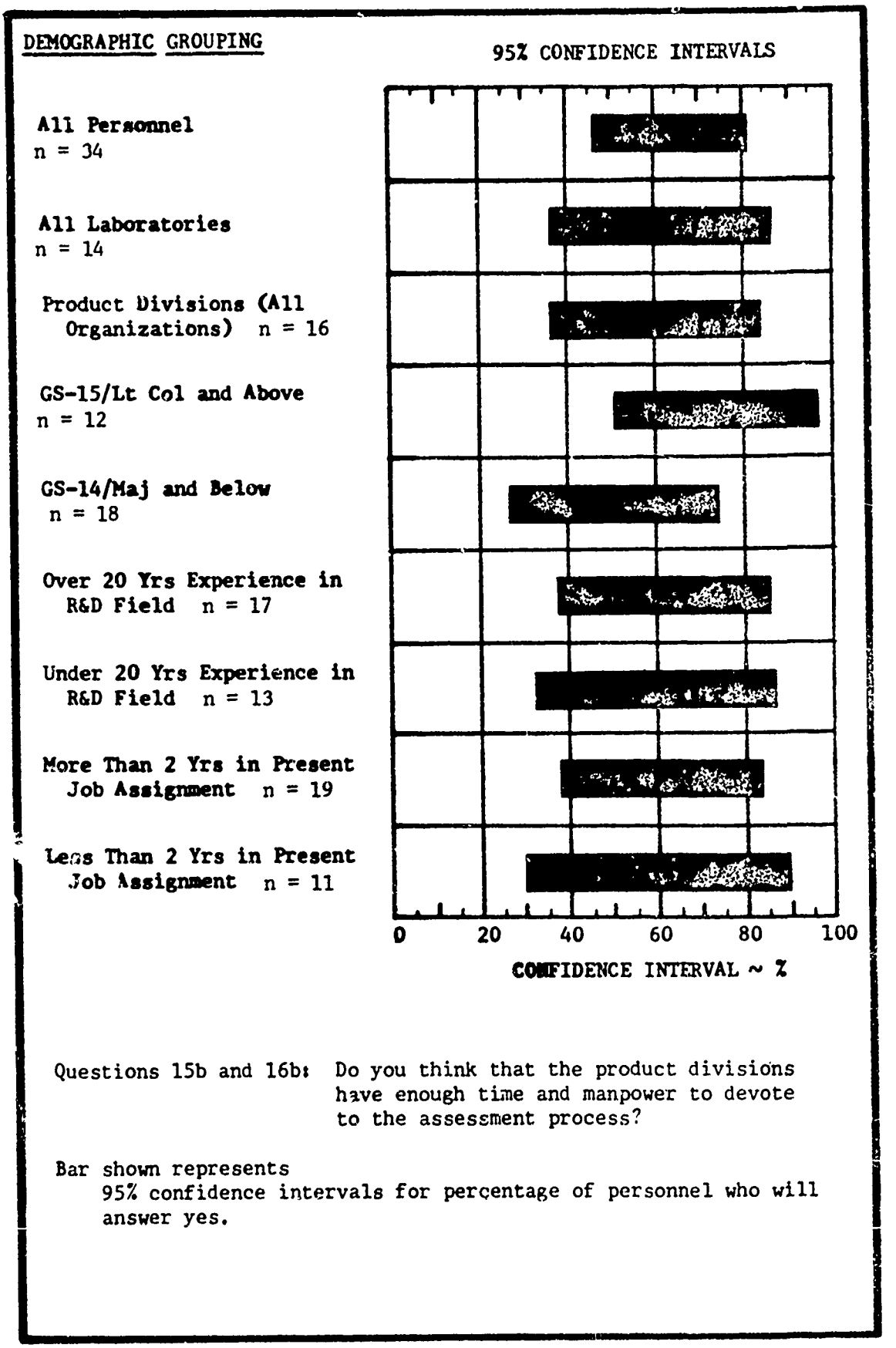


Figure 10. 95% Confidence Intervals--Questions 15b and 16b

2. I think that the assessment process is valuable. We should do it in preference to some of the "mickey mouse" exercises we have to do now. We do have deadlines, and we really can't do as good a job as you ought to be allowed.

3. You can never get a handle on the assessment in the way they would like for you to do it.

4. We could have spent more time on "payoff." To really assess payoff you have to do a detailed system analysis. . . .

The confidence intervals computed for the demographic groupings based upon a person's grade depart from the generalization stated above. The results shown in Figure 10 suggest that a larger percentage of the higher grade personnel would be expected to answer "yes" than the lower grade personnel. Moreover, the difference in the responses given by the two groups was found to be significant at the .056 level. Thus, the data collected suggest that the higher grade personnel tend to feel that enough time and manpower does exist; whereas the lower grade personnel tend to be more pessimistic regarding this issue.

Recommendation. It is recommended that the concerns expressed by the personnel in the lower grades be recognized by the laboratory and product division management personnel. The planning activities regarding new ADTPs should include sufficient time for the product divisions to complete the assessments, and the supervisory personnel within the product divisions should establish appropriate in-house priority for accomplishing the assessments.

Difference Between Demographic Groups. The statistical hypothesis that there tends to be no difference in the responses given by the personnel in the different demographic groupings was tested using the contingency table test. No instance was found for which the hypothesis could be rejected at a critical value of .05.

Laboratory Responsiveness (Question 17)

General. The personnel were asked to give their perception of the degree of laboratory responsiveness in answer to interview Question 17.

> Question 17: Another goal of the ADTP assessment policy is to increase the responsiveness of the laboratories to the product divisions with respect to the conduct of advanced development programs. Please indicate your thought on the degree of responsiveness that should exist and what will exist now that the ADTP assessment policy is in effect.

All the personnel interviewed answered this question. Also, note that the question required those interviewed to consider two different situations--the degree of responsiveness that should exist and the degree of responsiveness that will exist. The two responses given by each person interviewed were considered jointly as a paired response, and the sign test was used to analyze the data.

The null hypothesis that now the ADTP assessment policy is in effect the laboratories will tend to be more responsive to the product divisions than they should be was tested. Each of the thirteen demographic groups defined in Table V were considered in the analysis. The results of the hypothesis test performed are shown in Table XXI and Figure 11.

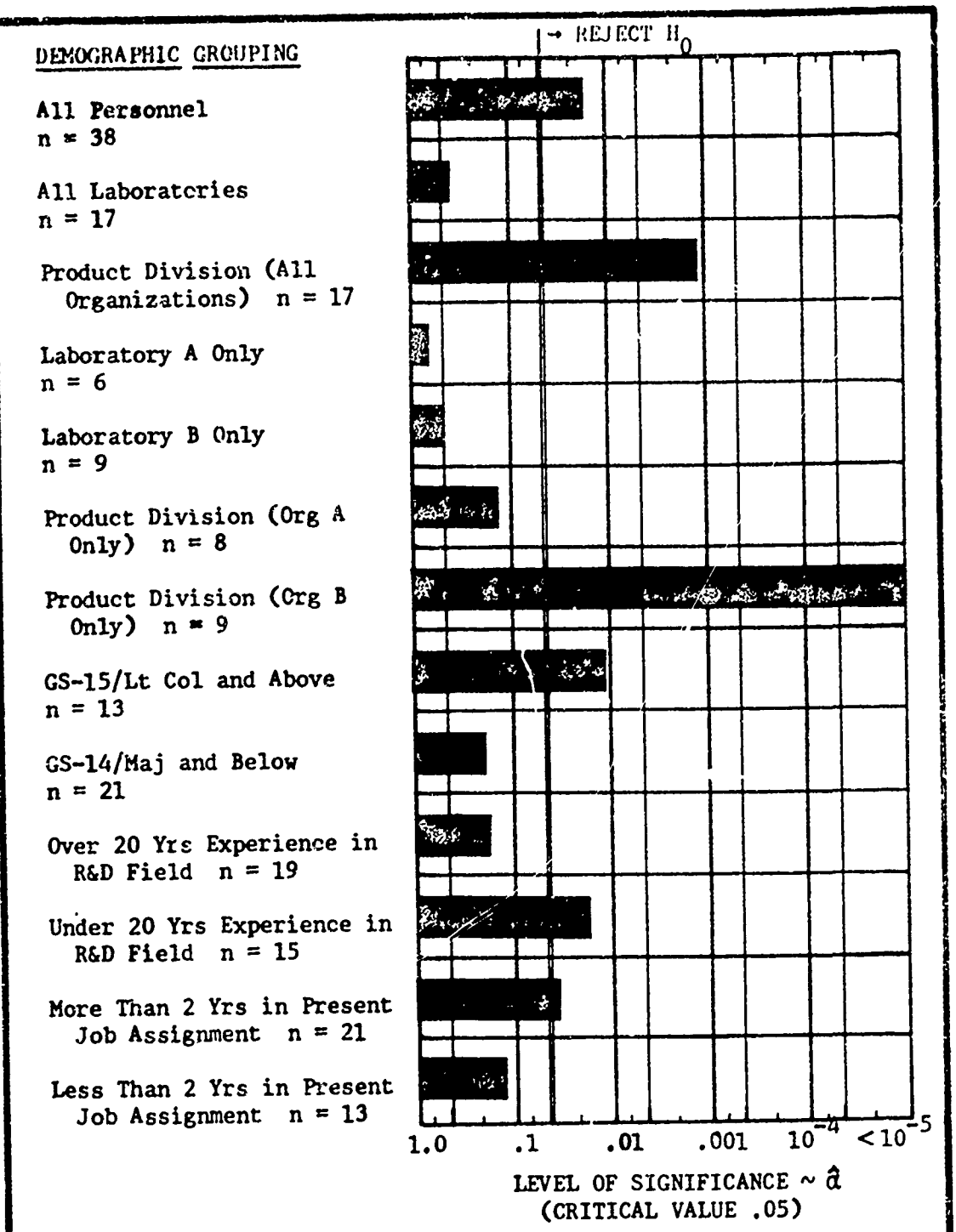
Table XXI is constructed in order to illustrate the responses given by the different demographic groupings. The first table column lists the short title of the demographic grouping. The values shown in the next three columns represent the number of personnel who answered this question such that their responses imply the perception identified by the table column heading. The entries shown in the last table column are the values computed for the conservative level of significance. These values are also plotted in bar chart form in Figure 11. This figure is constructed in the same manner as Figure 5.

TABLE XXI

RESULTS OF SIGN TEST FOR QUESTION 17

Now That the Assessment Policy Is in Effect the Laboratories Will Be:	More Responsive Than They Should Be	Less Responsive Than They Should Be	As Responsive As They Should Be	Conservative Level of Significance
All	3	26	9	.017**
Lab	3	9	5	.402
P.D.	0	15	2	.001**
Lab A	2	3	1	.656
Lab B	1	5	3	.500
P.D. A	0	6	2	.145
P.D. B	0	9	0	0**
GS 15/LC & Above	1	11	1	.011**
GS 14/Maj & Below	2	13	6	.192
Over 20 Years	3	12	4	.180
Under 20 Years	0	12	3	.017**
More Than 2 Yrs	2	15	4	.039**
Less Than 2 Yrs	1	9	3	.133

** Reject Null Hypothesis



H_0: Now that the ADTP assessment policy is in effect, the laboratories will tend to be more responsive to the product divisions than they should be.

H_1: The laboratories will not tend to be more responsive to the product divisions than they should be.

Figure 11. Results of the Sign Test--Question 17

Findings. The results of the analysis indicate that the null hypothesis can be rejected for the All Personnel demographic grouping. Thus, it can be concluded that, overall, the personnel interviewed perceived that the laboratories would not be more responsive than they should be. Furthermore, twenty-six (68%) of the personnel perceived that the laboratories will be less responsive than they should be; whereas only nine (24%) individuals perceived that the laboratories will be as responsive as they should be. This finding suggests that those interviewed perceived that the laboratories will be less responsive to the product division than they should be.

The results shown in Table XXI and Figure 11 indicate that the null hypothesis can be rejected for the All Product Division Organizations demographic grouping, but not for the All Laboratories demographic grouping. It can also be seen that fifteen (88%) of the product division personnel perceived that the laboratories will be less responsive than they should be. The laboratory personnel tend to disagree with this view; however, they did not exhibit a strong consensus of opinion. Three (18%) individuals indicate that they felt that the laboratories will be more responsive; five (29%) indicated as responsive; nine (53%) indicated less responsive.

The remaining demographic groupings also differed in the perception of laboratory responsiveness. The null hypothesis can be rejected for the GS-15 Lt Col and Above grouping, but not for the GS-14 Maj and Below grouping. Similar results can be seen to exist for the longevity demographic groupings. Thus, it appears that a person's grade, length of service in the R&D field, and time in present job assignment may affect the perception held regarding the laboratories' responsiveness.

Personnel Attitude (Question 18)

General. This question was stated as follows:

Question 18: The ADTP assessment policy is a good idea.

All of the personnel interviewed answered this question, and many offered additional comments illustrating their view of the assessment process.

Findings

General. In general, the personnel interviewed were very favorable to the assessment process. Twenty-seven (71%) individuals marked either "agree" or "strongly agree' in response to this question, and thirty-four (89%) marked a response from "inclined to agree" to "strongly agree."

The responses were also considered by demographic groupings. Confidence intervals were computed for the percentage of personnel expected to answer "inclined to agree" or higher. These confidence intervals are shown in Figure 12. This figure is constructed in the same manner as Figure 8. The results shown in Figure 12 indicate a favorable attitude toward the assessment process. Approximately 65% of the personnel can reasonably be expected to be in favor of the assessment process, even if the lower bound of the confidence interval is assumed to represent the true value of the percentage. It can also be seen that very little difference exists between the confidence intervals computed for the various demographic groupings.

Difference Between Demographic Groupings. The statistical hypothesis that there is no difference between the responses given by individuals in two related demographic groupings was tested using the Smirnov two-sample test (see Chapter III). This hypothesis could not be rejected at a reasonable level of significance for any of the six pairs

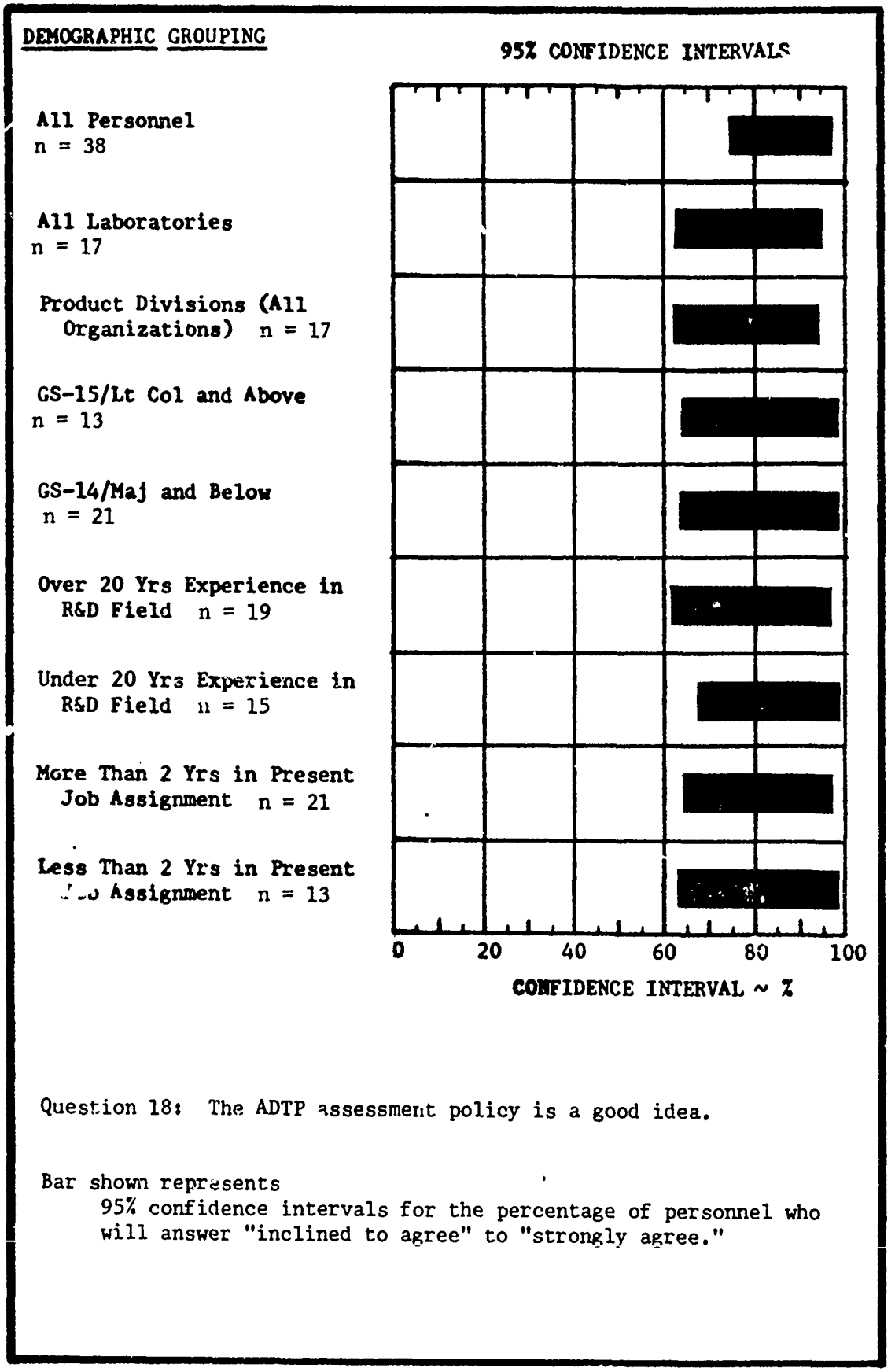


Figure 12. 95% Confidence Intervals--Question 18

of demographic groupings considered. The demographic grouping pairs considered were the same as those considered during the analysis of the responses to Question 6.

Personnel with Favorable Attitudes. For the purposes of analysis, an individual who gave a response from "inclined to agree" to "strongly agree" was considered to be in favor of the assessment process. Some of the comments offered by these personnel were favorable, and some pointed out some areas of concern. The favorable comments are summarized below:

1. The policy forces specific comments from the product divisions and creates a corporate spokesman.
2. The policy improves communication among the various product division organizations.
3. The policy will increase the likelihood of an ADTP being used by the product divisions.

The areas of concern expressed can be summarized as follows:

1. The assessment idea is good in theory, but the implementation is questionable. The timeliness of the product division assessments, the bias of an assessment, and the lack of visibility as to how the assessments will be used by HQ AFSC were cited as areas of concern regarding the implementation of the assessment process.
2. There is a danger of overemphasis being placed on pleasing the product divisions. The long term technology advances may suffer.

The individual who regarded timeliness of the assessment process as a problem area indicated that the product division had been working on the assessment he was familiar with for "almost a year." The individual who indicated that he was not aware of how HQ AFSC uses the assessments was one of the last ten personnel interviewed. As a result of his comment, the researcher made it a practice to ask the remaining personnel interviewed if they were aware of how the assessments were used or if they had received feedback

from HQ AFSC regarding the assessments they were familiar with. None of these individuals indicated a positive answer to this verbal question.

Recommendations. Two recommendations are offered regarding the implementation of the assessment process. First, it is recommended that a definite time period be established for the product division to complete an assessment in the event that the forty-five day time period defined in the implementing regulation cannot be met. It is recognized that the forty-five day period may be insufficient to conduct appropriate research and negotiation regarding a complex ADTP, but it is felt that the assessment period should not be left open ended in these situations. Secondly, it is recommended that consideration be given to improving the downward communication regarding the use of the assessments by HQ AFSC and the adequacy of the assessments themselves.

Personnel with Unfavorable Attitude. Personnel were considered to hold an unfavorable attitude regarding the assessment process if they indicated a response of "strongly disagree" to "undecided." One laboratory individual marked "strongly disagree" in answer to this question. He offered the following comment.

> You don't sell a program by writing a plan. First you sell it; then you write the plan. I think the lab should work closely with the product divisions in the planning of an ADTP, and I think the product divisions should have a vote regarding an ADTP, but I don't think they should have a veto. The assessment policy gives them a veto. The assessments have been too short-term; I think the process will be eliminated. Air Staff disagrees with XR having that much power. They have already turned around one assessment.

Also, one product division individual marked "disagree" in answer to the question. The comment provided by this individual is stated below.

> We have super internal coordination problems. I rewrote my assessment at least six times. Both groups

> have to take responsibility. The product divisions have the authority to kill a program now. What happens if a good program is cancelled because of a negative product division assessment?

It can be seen from these two comments that these personnel expressed concern regarding an apparent shift of ADTP decision power to the product division.

Two individuals indicated that they were undecided regarding the assessment process. Only one of them commented on his answer. He expressed the following view:

> I think it is just a way to make money decisions for people at AFSC. They are getting somebody to do their job for them.

Additional Technology Transfer Mechanisms (Question 19)

General. The personnel interviewed were given a description of five additional actions that could be taken to improve the transfer of technology and were asked if these actions had enough merit to warrant further consideration. The specific actions proposed are described in Chapter III under the section entitled "Additional Technology Transfer Mechanisms." All of the personnel interviewed answered this question, a and the mean response given by the various demographic groupings varied from 2.11 to 5.11 (see Table F-VIII). This numerical range corresponds to a word answer range of "disagree" to "inclined to agree." Thus, the mean responses tend toward the "disagree" end of the measurement scale. This suggests that, in general, those interviewed did not perceive that the proposed actions warranted further consideration. However, the analysis performed indicates that some of these actions are less preferred than others.

Perception of Proposed Mechanisms

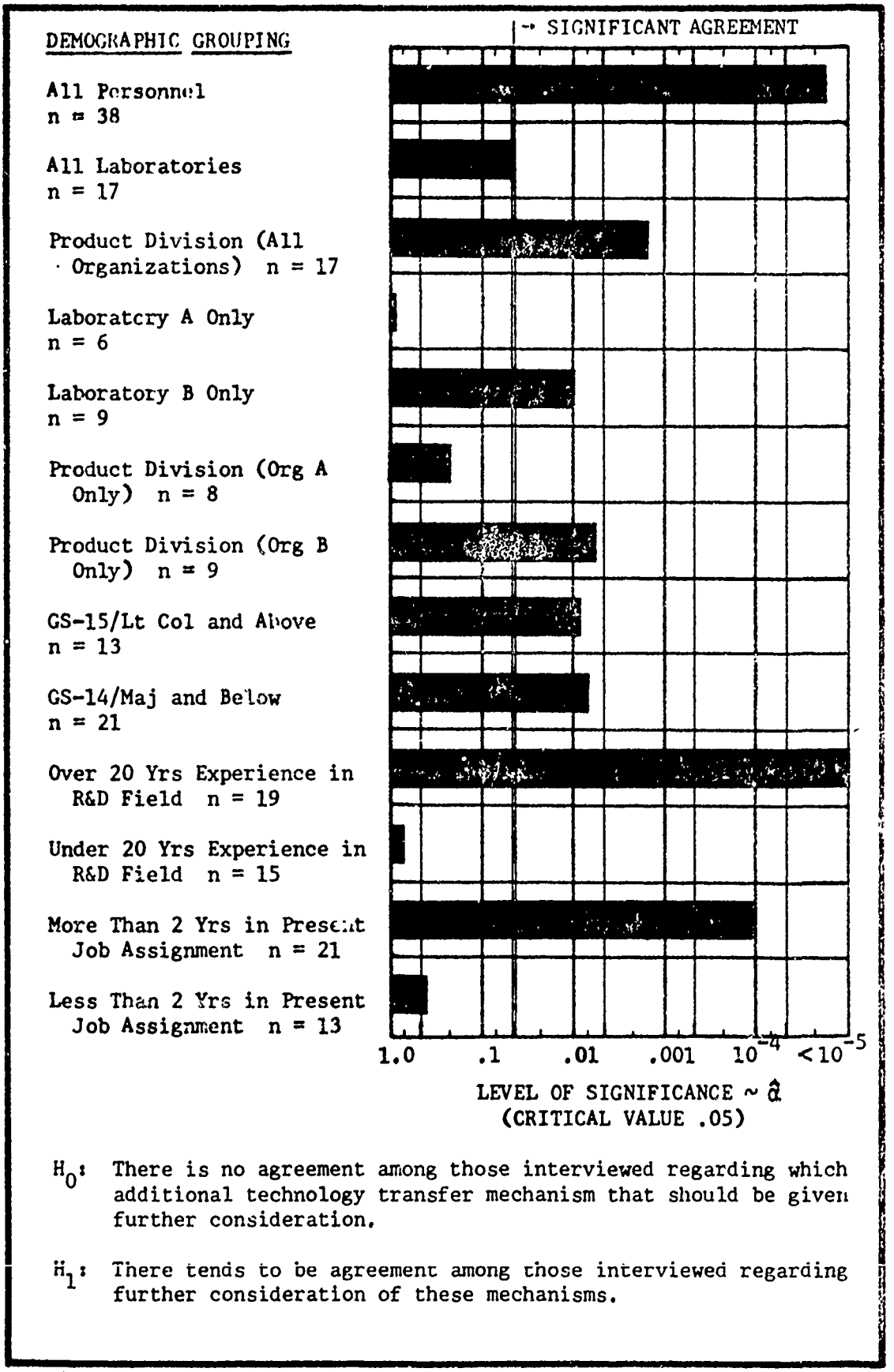
Agreement. The null hypothesis of no agreement was tested

using the coefficient of concordance test. Each of the thirteen demographic groupings was considered, and the results of these tests are shown in Figure 13. This figure is constructed in the same manner as Figure 5.

It can be seen that when the responses from all of the personnel interviewed were considered as a group, significant agreement was found to exist. However, when the responses were considered by demographic groupings, four of the twelve remaining groupings failed to exhibit significant agreement. Note that the agreement for the All Laboratories grouping is considered significant ($\hat{\alpha}$ = .052) although the value of the level of significance is slightly greater than the critical value of .05.

It was postulated that the lack of agreement observed for the Under 20 Years and Less Than 2 Years demographic groupings might be caused by the mixture of laboratory and product division personnel in these two groupings. Accordingly, the no-agreement null hypothesis was again tested, and in these tests the responses given by the laboratory and product division personnel which comprised these two groups were considered separately. The smallest value of the level of significance obtained ($\hat{\alpha}$ = .18) would not allow for the rejection of the null hypothesis. Thus, it is concluded that the differences in agreement shown in Figure 13 for these longevity demographic groupings are in fact due to longevity factors and not to the mixture of laboratory and product division personnel.

Preferred Order. Estimates of the true preferential order of the additional technology transfer mechanisms are shown in Table XXII. This table is constructed in the same manner as Table VIII. The results shown in Table XXII indicate that the mechanism "make future funding contingent on past transfers was unanimously the least preferred action.



H_0: There is no agreement among those interviewed regarding which additional technology transfer mechanism that should be given further consideration.

H_1: There tends to be agreement among those interviewed regarding further consideration of these mechanisms.

Figure 13. Results of Coefficient of Concordance Tests--Additional Technology Transfer Mechanisms (Question 19)

TABLE XXII

RANKS ASSIGNED TO ADDITIONAL TECHNOLOGY TRANSFER MECHANISMS

Rank Assigned By:	All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B	GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Product Divisions Rate Labs	5	5	5		5		5	5	5	5		5	
Labs and Product Divisions Rate Each Other	4	4	3		4		3	3	4	4		4	
Labs Rate Product Divisions	3	2	4		2		4	4	3	3		3	
Establish Technology Transfer Agency	2	3	2		3		2	2	2	2		2	
Make Future Funding Contingent on Past Transfers	1**	1	1**		1		1	1*	1*	1**		1*	

No Significant Agreement

No Significant Agreement

No Significant Agreement

** Difference from highest ranked mechanism in statistically significant ($\hat{\alpha} \leq .050$).

* Difference from highest ranked mechanism is marginally significant ($.050 < \hat{\alpha} \leq .1$).

Furthermore, the personnel in three of the demographic groupings assigned ranks so that the difference between the rank assigned to this mechanism and that assigned to the highest ranked mechanism is significant at the .05 level, and three assigned ranks so that the difference is significant at the .1 level.

Differences between the ranks assigned to the other proposed mechanisms were not found to be significant at a reasonable level of significance. However, it can be seen from the results shown in Table XXII that the data suggest that the rating schemes tend to be preferred over establishing a technology transfer agency. It should be noted that this conclusion does not imply that the rating schemes were endorsed. If the mean of the responses assigned to the highest ranked mechanism, "product divisions rate laboratories," are considered (see Table F-VIII), it can be seen that these mean values range from 3.67 to 5.11. Thus, it can be concluded that the additional technology transfer mechanisms proposed were not strongly endorsed by the personnel interviewed.

Several personnel offered comments regarding these proposed mechanisms. The general nature of these comments are summarized below.

1. The mechanisms place too much emphasis on transferring technology. Sometimes it is best not to transfer a bad technology.
2. A technology transfer agency is a good idea in theory, but in practice it would probably create more bureaucracy and be a drain on manpower. This function could best be accomplished in the present development planning organizations.
3. There are many factors which determine whether an ADTP is used in a system application. Therefore, future funding should not be contingent upon past transfers unless it is limited to a basis for reward.
4. The rating systems will probably just lead to a contest.

Differences Between Demographic Groupings. The statistical

hypothesis that there tends to be no difference in the responses given by the personnel in the various demographic groupings was tested. The procedure followed was the same as described for this test in Question 6. One instance was found in which the difference was significant at the .05 level. It was determined that the laboratory and product division personnel tend to respond differently in scoring the mechanism "make future funding contingent upon past transfers." The mean of the responses given by laboratory personnel was found to be 2.59. The corresponding value for the product division personnel was 3.24. Thus, both groups of individuals tend to reject this concept; the significant difference found was due to the fact that the laboratory personnel tend to reject the concept more strongly than the product division personnel.

Chapter Summary

A detailed analysis of the data collected during the structured interviews is presented in this chapter. Generally, the discussion proceeds on a question by question basis. The results of the analysis are synthesized into conclusions and recommendations in the next chapter, Chapter V. A summary of these results in therefore not repeated in this chapter summary.

V. Conclusions and Recommendations

The analysis performed in Chapter IV was structured around the interview questions. It is felt that a question by question formulation of conclusions and recommendations would be fragmented. Accordingly the principal conclusions and recommendations formulated as a result of this research effort are presented in relation to the objectives of the research effort stated in Chapter I. In summary form, these objectives are as follows: (1) characterize the perceived effectiveness of the ADTP assessment policy, (2) determine if this perceived effectiveness is dependent upon various demographic groupings, (3) identify problem areas and recommend solutions, (4) determine the general attitude of personnel with respect to the assessment process, and (5) explore the desirability of introducing additional technology transfer mechanisms.

Perceived Effectiveness of ADTP Assessments

Overall, the personnel interviewed perceived that the assessment process will foster a relationship between the laboratories and the product division which will, in general, be conducive to the transfer of technology to system application. Those interviewed also perceived that this relationship would tend to encourage improved communication and dialogue between the laboratory and product division personnel. Moreover, it can be concluded that the personnel interviewed perceived that the ADTP assessment policy would not tend to make the laboratories more responsive than they should be. However, some laboratory personnel were found to disagree with this conclusion.

Transfer of Technology. The personnel interviewed perceived that the assessment policy will foster a relationship which will enhance the

transfer of technology in two ways. First, the data collected suggest that a balance between the push of technology and the pull of the product division need is likely to be enhanced by the assessment process. This conclusion is derived from the following specific findings and observations (referenced to appropriate figures and tables in Chapter IV).

1. There tended to be agreement among those interviewed regarding which technology transfer aiding events the assessment policy will encourage (see Figure 5).

2. The events "establish an early informational linkage" and create "strong product division support" were perceived to be those most likely to be encouraged by the assessment process (see Table VIII).

3. The creation of an early informational linkage and a strong manufacturer (i.e., product division) support have been cited by other researchers as two principal factors required in order to establish an equilibrium between technology push and demand pull (Teich, 1974:42, 43; ODDR&E, 1969:47).

4. "Establish that technology is mature" and "provide a forum for problem resolution" were perceived to be the two event least likely to be encouraged by the assessment process (see Table VIII).

The second way in which the transfer of technology will likely be enhanced is by reducing the significance of two barriers to the transfer of technology--"communication barriers" and "lack of transfer management structure." This conclusion is derived from the following specific findings:

1. The proposed barriers to technology were not perceived to be equally significant (see Chapter IV, Questions 7 and 8).

2. There tended to be agreement among those interviewed regarding the significance of the proposed barriers (see Figure 6).

3. Those interviewed perceived that the significance of "communication barriers" and "transfer management structure would be affected by the assessment process (see Tables IX, X, and XI).

4. The significance of the remaining proposed barriers to technology transfer was not perceived to b affected by the assessment process.

The fourth finding cited above indicates that the assessment process was not perceived to reduce the significance of "inertia barriers," "time barriers," "cost barriers," "technology barriers," and "geographic distance." Furthermore, the first three barriers were perceived to be more significant than the last two (see Tables IX and X). The subjective comments received during the interviews suggest that the higher perceived significance of the first three barriers may be due to the performance, schedule, and cost tradeoffs that must be made during the weapon system acquisition process. Thus, the assessment process was not perceived as a final solution to the technology transfer problem.

Recommendations. It is recommended that research on the barriers to the transfer of technology be continued. It might be possible to achieve a better understanding of the characteristics of the more significant barriers remaining by focusing a thesis effort on these factors.

Communication and Dialogue. The effect of the assessment process on communication and dialogue was considered separately. One conclusion reached is that the personnel interviewed did not perceive that the visibility of ADTPs would be vastly improved by the assessment process. However, it is felt that this conclusion may be biased because of the timing of the implementation of the assessment policy. These conclusions were derived from the following specific findings and observations:

1. The percentage of the personnel interviewed who indicated that they had not learned of ADTPs because of the assessment process was generally relatively large--37% for Question 9 and 61% for Question 10.

2. The percentage of personnel interviewed who indicated that they had learned of more than four ADTPs because of the assessment process was relatively small--13% for Question 9 and 10% for Question 10.

3. Many of the ADTPs were ongoing when the assessment policy

was implemented; thus, the personnel had an opportunity to learn to these programs by other means before the assessment policy was established.

It was also concluded that the product division personnel perceived that communication with laboratory personnel would be enhanced by the assessment process and vice versa. However, the overall communication pattern was not perceived to be significantly changed by the assessment process. These conclusions are derived from the following specific findings (referenced to appropriate figures and tables in Chapter IV):

1. There tended to be agreement among those interviewed regarding the relative amount of their working time spent in communication about new ADTPs with personnel in "higher headquarters," "product divisions," "laboratories," "AFLC," and "operational commands" (see Figure 7).

2. Those interviewed perceived that more of their working time would be spent in communication about new ADTPs with personnel in "laboratories," "higher headquarters," and "product divisions" than would be spent in communication with personnel in "operational commands" and "AFLC" (see Tables XIII and XIV).

3. Thirteen (76%) of the product division personnel indicated that they perceived that more of their working time would be spent in communication with laboratory personnel now that the assessment policy is in effect. Moreover, twelve (75%) of the laboratory personnel indicated that they perceived that more of their working time would be spent in communication with product division personnel. These percentages were found to be statistically significant (see Tables XVI and XVII).

4. Neither the laboratory personnel nor the product division personnel indicated that they perceived that the amount of their working time spent in communication with personnel in the other agencies considered would be significantly affected (see Tables XVI and XVII).

The data collected tends to suggest that the laboratory and product division personnel interviewed perceived that more time should be spent in communication with personnel in the counterpart agencies than will be. However, the results were not statistically significant. The specific findings are as follows:

1. Ten (63%) of the laboratory personnel perceived that more time should be spent in communication with product division personnel than will be, and four (25%) perceived that less time should be spent (see Table XIX, Chapter IV).

2. Ten (59%) of the product division personnel perceived that more time should be spent in communication with laboratory personnel than will be, and two (12%) perceived that less time should be spent (see Table XIX, Chapter IV).

Overall, the personnel perceived that the assessment policy will tend to improve dialogue between themselves and personnel in the counterpart agencies. However, the strength of this perception appears to be dependent upon the organization considered. Also, those personnel who answered negatively regarding the dialogue issue did not express a consensus of opinion. These conclusions are derived from a consideration of the responses given in answer to Question 14. The following specific findings were detected:

1. Thirty-one (84%) of the personnel interviewed indicated that the assessment process would improve dialogue (see Question 14 discussion, Chapter IV).

2. All product division personnel interviewed perceived that dialogue would be improved.

3. Only personnel assigned to a laboratory perceived that dialogue would not be improved. Six (38%) individuals answered in this manner. The responses given by laboratory and product division personnel was found to differ statistically.

4. The subjective comments expressed by those personnel who answered negatively expressed three different views regarding the improvement of dialogue: (1) Existing channels for dialogue, which bypass the product division development planning offices, are adequate. (2) Laboratory personnel will become more defensive regarding their programs. (3) The concept of ADTP assessments is not desirable.

Laboratory Responsiveness. The conclusion that those interviewed perceived that the assessment process would not result in the laboratories being more responsive than they should be in based on the responses given in answer to Question 17. Some laboratory personnel do not agree with this

conclusion; however, these personnel did not exhibit a strong consensus of opinion as to whether the laboratories will be either more responsive or as responsive as they should be. The following specific findings support the above conclusions.

1. The hypothesis that the laboratories will tend to be more responsive than they should be could be rejected when the responses from all of the personnel interviewed were considered together (see Table XXI, Chapter IV).

2. The preceding hypothesis could also be rejected when the responses from just product division personnel were considered, but this hypothesis could not be rejected when the responses received from laboratory personnel were considered separately (see Table XXI, Chapter IV).

3. Three (16%) of the laboratory personnel indicated that they felt the assessment process would result in the laboratories becoming more responsive to the product divisions than they should be. Five (29%) individuals indicated that the laboratories would be as responsive as they should be, and nine (58%) people indicated that the laboratories would be less responsive than they should be (see Table XXI, Chapter IV).

Effect of Demographic Factors

Thirteen different organizational and nonorganizational demographic groupings were defined (see Table V) in order to investigate the effect of demographic factors. The specific procedure followed in performing the analysis are discussed in Chapter IV under the section entitled "Technology Transfer Aiding Events (Question 6)."

Although exceptions were found, it is concluded that, in general, the responses obtained in answer to the question were not found to differ significantly due to demographic factors considered. However, it should be noted that a relatively small number of interviews were conducted, and this resulted in some of the demographic groupings being very small (see Table VI, Chapter IV). The small size of the sample somewhat limits the ability to detect small differences between responses. The conclusion

regarding the effect of demographic factors is based upon the following observations and findings.

1. The responses given by the personnel were categorized into six pairs of demographic groupings. The answers to forty-one different questions were considered. In this count each answer of a multiple answer question is considered as one answer. Thus, 246 different tests were performed.

2. Only nine instances were found in which the responses given by personnel in different demographic groupings differed statistically.

The demographic factor which had the most effect on the responses were the individual's organization--primarily the laboratory and product division organizations. Answers to the communication and dialogue questions tend to be those most influenced by demographic factors. The specific findings supporting these conclusions are listed below:

1. In eight of the nine instances identified above, the two demographic groupings were product division personnel and laboratory personnel.

2. In six of the above eight instances, the significant difference in response occurred in the answers to the communication and dialogue questions (Questions 11, 12, and 14).

The remaining instances for which a significant difference in the responses was found to exist do not appear to be related to a central issue. The differences are summarized below:

1. The product division personnel tended to indicate that before ADTP assessments the "lack of incentive structure" was a more significant barrier to the transfer of technology than laboratory personnel did (see Table XII, Chapter IV).

2. Laboratory B personnel tended to indicate that before ADTP assessments a lack of a "transfer management structure" was a more significant barrier to the transfer of technology than laboratory A personnel did (see Table XII, Chapter IV).

3. Although both laboratory and product division personnel tended not to favor making funding of ADTP programs contingent upon past transfers, the laboratory personnel were found to be more strongly opposed to this idea than the product division personnel.

Problem Areas

Significant Problem Area. It is concluded that no significant problem area associated with accomplishing the assessment tasks exists. This conclusion was derived from the following findings:

1. The personnel in four of the demographic groupings considered were not found to exhibit agreement regarding the relative ease or difficulty of performing the assessment tasks (see Figure 9, Chapter IV). Thus, the accomplishment of any one task was not perceived to be consistently more difficult to accomplish by these personnel.

2. The mean of the response given for the tasks perceived to be the most difficult fell within the somewhat difficult range on the answer scale (see Table F-VI, Appendix F).

Potential Problem Areas

Assessments by One Person. Three product division personnel interviewed raised the issue that, within a given office, the assessment might be accomplished by only one person. Furthermore, it was pointed out that an annual reassessment might be accomplished by an individual who did not perform the original assessment and that the new assessor might or might not be familiar with the conclusion reached during the first assessment. The occurrence of these events might lead to less visibility of laboratory programs within the product division and inconsistent assessments.

Recommendations. It is recommended that the possibility of the above situations be recognized and, if required, that action be taken to minimize the negative aspects of one-person-assessments within an office. One action that could be taken is to insure that the results of the assessments are disseminated among the office personnel. Also, an office case file could be established for each laboratory program assessed. These files would provide a record of all past comments and data considered and could be referenced when performing future assessments.

Time and Manpower. Overall, the personnel interviewed perceived that the product divisions will have enough time and manpower to devote to the assessment process. However, some individuals, particularly those in the lower grade demographic groupings, expressed concern regarding the adequacy of the time and manpower availability to perform the assessment tasks (see Figure 10, Chapter IV).

Recommendation. It is recommended that the concerns expressed by these personnel be recognized by the laboratory and product division management personnel. The planning activities regarding new ADTPs should include sufficient time for the product divisions to complete the assessments, and the supervisory personnel within the product divisions should establish appropriate in-house priority for accomplishing the assessments.

Timeliness of Assessments. One individual assigned to a laboratory indicated that the product division had been working on the assessment that he was familiar with for "almost a year." It is recognized that the forty-five day period allowed by the implementing regulation may not allow for sufficient time to conduct appropriate research and negotiation if an ADTP is highly complex. However, it is felt that the assessment period should not be left open ended.

Recommendation. It is recommended that a definite time period for the product division to complete the assessment be established in the event that the forty-five day time period is insufficient.

Downward Communication Regarding Assessments. As a result of a comment received during the interviews, the researcher asked ten individuals if they were aware of how the assessments were used by HQ AFSC and if they had received feedback from HQ AFSC regarding the assessments with which they were familiar. No one indicated a positive answer to these questions.

Recommendation. It is recommended that consideration be given to improving the downward communication regarding the use of the assessments by HQ AFSC and the adequacy of the assessments themselves.

Personnel Attitude

Although some of the personnel interviewed held an unfavorable attitude regarding the assessment policy, most of those interviewed regarded the process favorably. This conclusion is based upon the following findings:

1. Thirty-four (89%) of those interviewed indicated that they were at least inclined to agree that the assessment policy was a good idea, and twenty-seven (71%) indicated that they either agreed or strongly agreed with the assessment policy (see Chapter IV, "Personnel Attitude (Question 18) Findings").

2. No significant difference was found in the responses given by personnel in the various demographic groupings.

The comments offered regarding the assessment policy are discussed in Chapter IV under the section entitled "Personnel Attitude." Generalizing, those personnel in favor of the assessment process felt that a product division spokesman would be created, that communication would be improved, and that the transfer of technology would be improved. Some concern regarding the implementation of the assessment process was expressed, and the danger of neglecting the long term technology advances because of overemphasis being placed on pleasing the product division was voiced. Those personnel opposed to the assessment process expressed concern regarding their perception that the decision power for approving an ADTP was being placed in the product division.

Additional Technology Transfer Mechanisms

None of the additional technology transfer mechanisms proposed was strongly endorsed by those interviewed. However, the rating schemes proposed generally tended to be preferred over either "establishing a

technology transfer agency" or "make future funding contingent on past transfers." These conclusions are based upon the following specific findings (referenced to appropriate figures and tables in Chapter IV).

1. Personnel in nine of the thirteen demographic groupings exhibited agreement regarding the ranking of the proposed mechanism (see Figure 13).

2. The mean of the responses given for the proposed mechanisms generally fell toward the "disagree" end of the measurement scale (see Table F-VIII).

3. The rating schemes were consistently ranked the highest by the personnel in the various demographic groupings (see Table XXII).

4. The establishment of a technology transfer agency was ranked the second least preferred by the personnel in seven of the demographic groupings (see Table XXII).

5. Tying future funding to past transfers of technology was ranked the least preferred by the personnel in all of the demographic groupings (see Table XXII).

Chapter Summary

As a summary statement it can be concluded that those interviewed perceived that the ADTP assessment policy will tend to enhance both the transfer of technology and communication and dialogue between the laboratories and product divisions. Also, no significant problems were perceived to exist in accomplishing the assessment tasks. Generally, those interviewed perceived that the laboratories will not tend to be more responsive than they should be, but the laboratory personnel tend to disagree with this conclusion. A favorable attitude toward the assessment policy was expressed, but the additional technology transfer mechanisms proposed were not strongly endorsed.

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APPENDIX A

Abbreviations

Abbreviations

ADP - Advanced Development Program

ADTC - Armament Development and Test Center

ADTP - Advanced Development Technology Program

AF - Air Force

AFAL - Air Force Avionics Laboratory

AFAPL - Air Force Aeropropulsion Laboratory

AFATL - Air Force Armaments Technology Laboratory

AFCRL - Air Force Cambridge Research Laboratory

AFFDL - Air Force Flight Dynamics Laboratory

AFGL - Air Force Geophysics Laboratory

AFHRL - Air Force Human Resources Laboratory

AFIT - Air Force Institute of Technology

AFLC - Air Force Logistics Command

AFR - Air Force Regulation

AFRPL - Air Force Rocket Propulsion Laboratory

AFSC - Air Force Systems Command

AFSCP - Air Force Systems Command Pamphlet

AFSCR - Air Force Systems Command Regulation

AFWAL - Air Force Wright Aeronautical Laboratories

AFWL - Air Force Weapons Laboratory

ARL - Aerospace Research Laboratories

ASD - Aeronautical Systems Division

DDC - Defense Documentation Center

DLSIE - Defense Logistics Studies Information Exchange

DOD - Department of Defense

DOL - Director of Laboratories

DS&T - Director of Science and Technology

ESD - Electronic Systems Division

FCRC - Federal Contract Research Centers

FY - Fiscal Year

HQ AFSC - Headquarters Air Force Systems Command

HQ AFSC (CV) - Vice Commander, Headquarters Air Force Systems Command

HQ AFSC (DL) - Director of Science and Technology, Headquarters Air Force Systems Command

HQ AFSC (XL) - Development Plans, Headquarters Air Force Systems Command

HQ USAF - Headquarters United States Air Force

JPG - Joint Planning Group formed at HQ AFSC to develop a proposed investment strategy

LUS - Laboratory Utilization Study

NAE - National Academy of Engineering

NIH - Not invented here

NSF - National Science Foundation

NTIS - National Technical Information Exchange Service

ODDR&E - Office of the Director of Defense Research and Engineering

OOC - Office of the Comptroller

OSD - Office of the Secretary of Defense

PMD - Program Management Directive

R&D - Research and Development

RADC - Rome Air Development Center

RDT&E - Research, Development, Test, and Evaluation

RML - Range Measurements Laboratory

RTD - Research and Technology Division

SAMSO - Space and Missle Systems Organization

SPO - Systems Program Office

TPP - Technology Program Plan

USAF - United States Air Force

6.1 - Research

6.2 - Exploratory Development

6.3 - Advanced Development

6.4 - Engineering Development

APPENDIX B

Related Documentation

GSM/SM/76S-21

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SYSTEMS COMMAND
ANDREWS AIR FORCE BASE, DC 20334

29 JAN 1975

REPLY TO ATTN OF: CV

SUBJECT: Monitor and Control of Laboratory Advanced/Engineering Development Programs

TO: ADTC ASD ESD SAMSO AFAL AFAPL AFATL AFCRL
AFFDL AFHRL AFML AFRPL AFWL AMD AFDC

(Commander/Director)

1. The Laboratory Utilization Study, chaired by Maj Gen Chapman, recommended that AFSC Laboratories' responsiveness to the Product Divisions be increased, especially in the conduct of Advanced Development (6.3) and Engineering Development (6.4) Programs. The desired result is to improve the transition of technology to system application.

2. Implementation of this recommendation is being staffed within this Headquarters. Toward this end, it is envisioned that the Laboratories will annually submit 6.3/6.4 program documentation to AFSC through the appropriate Product Division(s). The Product Divisions will add an assessment of the relevance, cost implications, timeliness, payoff and relative priority of proposed efforts, both new starts and continuing programs. This assessment and appropriate recommendations will be used by AFSC/XR to establish Command positions on those Advanced and Engineering Development programs that should be pursued. Management of approved programs will remain the responsibility of DL.

3. Your suggestions as to how Product Divisions can most effectively participate in the guidance and coordination of advanced development programs are solicited. Considerations such as documentation required, procedures needed and Product Division point of contact should be addressed.

4. Request your comments be provided by 21 February 1975 to AFSC/XRP. Primary point of contact is Lt Col James P. Eri, AFSC/XRPP, AV 858-4825; alternate point of contact is Col Robert Sigethy, AFSC/DLXB, AV 858-2968.

JOHN B. HUDSON, Lt Gen, USAF
Vice Commander

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SYSTEMS COMMAND
ANDREWS AIR FORCE BASE, DC 20334

GSM/SM/76S-21

/ TO
N OF: CV

5 DEC 1975

SUBJECT: Monitor and Control of Laboratory Advanced/Engineering Development Programs (AFSC/CV Ltr, 29 Jan 75)

TO: SAMSO ASD ESD ADTC AMD AFWAL AFAL AFAPL
AFATL AFCRL AFFDL AFHRL AFML AFRPL AFWL RADC

(Commander/Director)

1. The several ASD test case assessments of proposed advanced development projects and the 15 August 1975 "quick response" prioritizations of 6.3 efforts by all product divisions have been of particular value These efforts were not only helpful in terms of implementing assessment policy but provided a valuable contribution to the programming and budgeting exercises during August and September 1975.

2. Based on our experience thus far, a more definitive set of procedures for the assessment process has been formulated (attached). Both in-depth assessment of proposed (new) advanced development projects and an annual assessment of all 6.3 efforts are covered. We desire to implement the process immediately. Therefore, laboratories will forward technology program plans for proposed FY 77 and FY 78 new start advanced development efforts to appropriate product division assessment focal points (ADTC/XR, ASD/XR, ESD/XR, SAMSO/XR) as soon as possible. The product divisions, in turn, will accomplish coordinated assessments, to be forwarded to AFSC/XR.

3. The assessment process serves a number of worthwhile purposes. First, it should encourage early dialogue between the laboratories and product divisions. Second, both initial and recurring assessment results will be of invaluable use to this headquarters during the programming and budgeting cycles. Finally, a continuing involvement of product division people with laboratory programs will enhance the successful transition of technology to operational capability.

4. Please provide any comments on the new procedures to AFSC/XRP. Contact is Lt Col J. P. Eri, XRPO, AUTOVON 858-2054.

ROBERT T. MARSH, Lt Gen, USAF
Vice Commander

1 Atch
Assessment Procedures

DEPARTMENT OF THE AIR FORCE
Headquarters Air Force Systems Command
Andrews Air Force Base, DC 20334

AFSC REGULATION 80-19

31 March 1976

Research and Development

ASSESSMENTS OF ADVANCED DEVELOPMENT TECHNOLOGY PROGRAMS

This regulation prescribes the responsibilities and procedures for assessing and advocating technology base (nonsystems) advanced development programs. It establishes a uniform policy to initiate, control, and advocate nonsystems advanced development (6.3) programs. It will provide an effective basis for recommending the allocation of resources and enhance the transfer of demonstrated technology into weapons systems development programs and into the operational inventory.

1. Terms Explained:

a. Laboratories. Defined as AFATL, AFGL, AFHRL, AFRPL, AFWL, AFWAL, RADC, and AMD/RD. Additionally, field organizations that originate and manage technology base advanced development programs may be defined as a laboratory for this regulation (for example, AFCEC and SAMSO).

b. Planning Summary. An expanded program element, project, or task summary of planned efforts. It contains all data elements of DD Form 1634, Research and Development Planning Summary, and AF Form 1537, Weapon System Budget Estimate. Normally, a product of AFSC computerized management information systems which provides information on resources, objective and payoff, plans, schedule, progress and accomplishments. May be used instead of Technology Program Plan when approval is indicated on AFSC Form 56, AFSC Program Direction.

c. Program Assessment. A formal evaluation by SAMSO, ASD, ESD, or ADTC of a proposed or ongoing program addressing relevance, payoff and benefit, priority, cost and schedule, and timeliness. Assessments of proposed programs will be an in-depth review. SAMSO, ASD, ESD, and ADTC will assess ongoing programs annually to reappraise all efforts previously assessed and of continued interest to them.

d. Technology Program Plan (TPP). Primary planning document tailored to describe and support the program concisely and adequately. It is written at the program element, project, or task level as appropriate, reviewed annually, and updated when required.

2. Policy. AFSC field commands and laboratories will originate program planning documentation annually in response to formal direction, or to establish an advanced development program to demonstrate emerging technology. When the documentation is forwarded to HQ AFSC, copies will be sent to each field command where a potential application exists for an assessment. If SAMSO, ASD, ESD, and ADTC do not have a direct interest, a using organization (such as a major command, another service, or a DOD agency) will be requested to provide an assessment. The assessement will be used in developing an AFSC position and for interfacing with HQ USAF in the approval and resource allocation process.

3. Assessments of New Programs:

a. Laboratories will initiate and generate TPPs for proposed advanced development programs that are either in response to program direction from HQ AFSC or are initiated within the laboratory. The TPP will concisely describe the program payoff, technical approach, management concept, required resources, schedule, and analysis of technical/resource/schedule risk. The specific weapon system improvements and development goals that the technology program is designed to benefit will be designated, if at all possible. Coordination will be obtained from all participating organizations. The TPP will be forwarded to AFSC/DL and copies sent to SAMSO, ASD, ESD, or ADTC if potential applications exist.

b. SAMSO, ASD, ESD, and ADTC will designate a focal point to assess the TPP (normally the Development Plans Office) and will perform an in-depth assessment of each factor in attachment 1. While SAMSO, ASD, ESD, and ADTC will not normally question the technical approach, comment based on experience with similar efforts is appropriate. An indorsement of an effort implies the intent to use successfully demonstrated technology if the intended application has persisted. SAMSO, ASD, ESD, and ADTC will send the assessment within 45 calendar days after receipt to AFSC/XR and a copy to the TPP originating organization.

c. HQ AFSC (XR) will send copies of the assessment to AFSC/DL and SD. HQ AFSC (XR) will be the lead agent in formulating AFSC

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position on the proposed programs and coordinate the position with HQ AFSC (DL) and other DCSs as appropriate. The AFSC position will take one of two forms:

(1) Programs Favorably Considered. A command letter will be sent to HQ USAF/RD requesting approval of the new start. While new programs may be advocated throughout the year, they will compete for available resources along with all other programs during annual budget submissions.

(2) Programs Not Favorably Considered. A letter, coordinated with staff, will be sent to the organization originating the TPP. The letter will explain why the proposed effort is not favorably considered and will provide additional instructions.

4. Annual Review and Assessment of Ongoing Programs:

a. Laboratories will normally be required to update TPPs annually to coincide with requirements of the budget process. In some cases, only updated Planning Summaries will be required. The updated TPP and/or updated Planning Summaries and Budget Estimates will be forwarded annually to AFSC/DL by mid-December and copies sent to the assessing divisions (SAMSO, ASD, ESD, or ADTC).

b. If SAMSO, ASD, ESD, or ADTC originally assessed the program, they will review the updated documentation and confirm or modify the previous assessment and the relative priority ranking. A statement of supportability, rationale, and priority ranking for each effort will be provided annually to AFSC/XR by 31 January. The format shown in attachment 2 will be used. Copies will be sent to the originating laboratories. HQ AFSC (XR) will send copies to AFSC/DL and SD.

c. At HQ AFSC, the updated TPP and assessments will be used in the annual budget determination. HQ AFSC (DL) will forward the TPP to HQ USAF when required by PMD instructions.

OFFICIAL

WILLIAM J. EVANS, General, USAF
Commander

DAVID M. HUDACK, Colonel, USAF
Director of Administration

2 Attachments
1. General Outline of Assessment Paper
2. General Outline of Annual Assessment of Advanced Development

AFSC—Andrews AFB Md 1976

AFSCR 80-19 Attachment 1 31 March 1976

GENERAL OUTLINE OF ASSESSMENT PAPER

Initial Indepth Assessment

This outline is designed to facilitate examination of payoff, relevance, cost implication, timeliness, and relative priority. Keep the paper short—four to seven pages. It must be clear and concise without constant reference to the ADP planning documents. Use philosophy of generic relationship of a main text to appendices: that is, main text must have enough information to structure position while appendix (ADP planning documents) can and should be consulted by reader if detailed background knowledge is desired.

Section I. Introduction. Give a brief history of ADP. Show outgrowth from 6.2 efforts; program chronology, including any past attempts to advocate this approach; reasons for past disapproval or deferments; reasons for submittal at this time.

Section II. Payoff. Payoffs can be looked at from two points of view: the effort will provide an "improvement" that coincides with the schedule of identifiable applications, or the effort, if successful, will provide a technological opportunity (that is, improved capability) of significant benefit to the Air Force, although the specific application cannot be identified at this time.

A. Potential Applications. Identify and discuss application cited in ADP; identify other applications, if any, that present themselves. Consider phasing with either new system developments and/or modifications to inventory systems.

1. What are the most probable applications?
2. What is the likelihood the identified applications will be developed? acquired?
3. How important are the applications to the Air Force?
4. What is the likelihood the proposed technology will indeed transition into identified applications?
5. Does this effort directly address an operational need or deficiency? What need? (Refer to development goals, ROCs, and so forth.) How critical is the need?
6. Is this effort a viable solution?

B. Technological Opportunities. Identify and discuss payoff cited in ADP; identify potential applications, if possible.

1. What is the improved capability?
2. Quantify the performance improvement projection, if possible.
3. Would the Air Force be likely to apply the technology?
4. What are the alternatives, if any, to getting the same or better performance improvements?

C. Cost Reduction. Discuss reduced cost aspects of the proposed payoff, if applicable.

Is there a potential for significant cost reduction?

Section III. Schedule. Review the proposed schedule for realistic achievability and for compatibility with the schedules of probable applications.

A. Is the program ready to transition to an advanced development effort?

B. Is there a sufficient exploratory development data base?

C. Is this primarily hardware-proof versus concept feasibility?

D. Are the program duration and objectives clearly defined?

E. Does the effort duplicate or complement other efforts? Explain.

(NOTE: Technical feasibility should not be questioned unless there are strong arguments against the approach; for example, previous near-identical experience.)

F. What is the confidence in proposed schedule estimates? What are the pacing elements?

G. How well does the planned schedule match the schedule of potential applications?

H. How realistic (viable) are application schedules?

I. Does the schedule accommodate a logical transition plan between completion of advanced development and systems application? What is that transition mechanism and its schedule?

(NOTE: A very important part of the dialogue that assessments should promote is for potential technology appliers to carefully review how far the laboratory intends to carry the 6.3 effort and to provide the laboratory with recommendations that would facilitate the transfer of technology.)

J. Are schedule changes called for (for example, to better match applications schedules)? What impact will there be on funding and schedule compatibilities?

K. Would risk introduced be acceptable?

Section IV. Cost. Is the cost consistent with the technical approach; are the cost projections realistic; is the payoff significant enough to warrant the development cost?

Section V. Priority. Based on the assessment factors in the sections above, indicate relative level of importance for the proposed effort. Summarize the rationale for the prioritization choice.

What importance category would you place this effort in?

1. Highest Priority. Should be funded as required to meet schedule recommended in assessment.
2. Middle Priority. The technology is assessed to be important to the Air Force; however, schedule is not so critical that funding reductions, with attendant schedule impact, cannot be made.
3. Low Priority. The assessed value to the Air Force is too low to warrant funding.

Section VI. Issues Conflicts. Identify any issues that exist between the laboratory and the assessing organization regarding the technical approach, the projected uses or applications of the technology, and timeliness of the demonstration. Develop the respective positions.

Section VII. Decision Options. Structure the decision options AFSC has to resolve the issues and either support or reject the planned program.

Section VIII. Recommendations. Develop the recommended position.

AFSCR 80-19 Attachment 2 31 March 1976

GENERAL OUTLINE OF

ANNUAL ASSESSMENT OF ADVANCED DEVELOPMENT

PROGRAM ELEMENT _____ TITLE _____

PROJECT/TASK NUMBER _____ TITLE _____

OBJECTIVE: (Brief explanation of the project's goals in terms of payoff, schedule, and application.)

CATEGORY: (Select one of the three priorities listed in attachment 1, section V, using the stated criterion.)

RATIONALE: (Provide appropriate rationale for categorization. It is important that a reaffirmation of continued support as stated in the initial indepth assessment be included. The rationale should include factors such as whether the schedule is still "on track" and in phase with most-probable applications. The reason for changes in support of efforts should be clearly stated.)

REFERENCE DOCUMENTATION: (List the source documentation used for the overall assessment, including date of documentation.)

APPENDIX C

Interview Schedule

PRIVACY STATEMENT

A. PRINCIPLE PURPOSE: THE INTERVIEW IS BEING CONDUCTED TO COLLECT INFORMATION TO BE USED IN RESEARCH AIMED AT ILLUMINATING AND PROVIDING INPUTS TO THE SOLUTION OF PROBLEMS OF INTEREST TO THE AIR FORCE AND/OR DOD.

B. ROUTINE USES: THE INTERVIEW DATA WILL BE ANALYZED AND THE RESULTS WILL BE INCLUDED IN WRITTEN MASTER'S THESIS AND MAY ALSO BE INCLUDED IN PUBLISHED ARTICLES, REPORTS, OR TEXTS. DISTRIBUTION OF THE RESULTS OF THE RESEARCH, BASED ON THE INTERVIEW DATA, WHETHER IN WRITTEN FORM OR PRESENTED ORALLY, WILL BE UNLIMITED.

C. PARTICIPATION IN THIS EFFORT IS ENTIRELY VOLUNTARY, AND NO ADVERSE ACTION OF ANY KIND MAY BE TAKEN AGAINST ANY INDIVIDUAL WHO ELECTS NOT TO PARTICIPATE.

D. YOUR RESPONSES AND COMMENTS WILL BE CONSIDERED ANONYMOUS.

INTERVIEW #_____ DATE _____

INTERVIEW SCHEDULE

BACKGROUND INFORMATION

1. ARE YOU PRESENTLY ASSIGNED TO A

___ LABORATORY
___ PRODUCT DIVISION (STAFF ORGANIZATION)
___ PRODUCT DIVISION (PROGRAM OFFICE)
___ PRODUCT DIVISION (FUNCTIONAL ORGANIZATION)
___ OTHER

2. WHAT IS YOUR GRADE? _____

3. HOW LONG HAVE YOU WORKED IN THE RESEARCH & DEVELOPMENT FIELD?

___ LESS THAN 1 YR
___ 1 YR TO 4 YRS
___ 4 YRS TO 8 YRS
___ 8 YRS TO 12 YRS
___ 12 YRS TO 16 YRS
___ 16 YRS TO 20 YRS
___ MORE THAN 20 YRS

4. HOW LONG HAVE YOU BEEN IN YOUR PRESENT JOB ASSIGNMENT?

___ LESS THAN 6 MOS
___ 6 MOS TO 2 YRS
___ 2 YRS TO 4 YRS
___ 4 YRS TO 6 YRS
___ 6 YRS TO 8 YRS
___ 8 YRS TO 12 YRS
___ MORE THAN 12 YRS

5. IF YOU WORK IN A PRODUCT DIVISION, PLEASE SELECT THE ONE STATEMENT WHICH COMES CLOSEST TO REPRESENTING THE DEGREE TO WHICH YOU HAVE PARTICIPATED IN ADP ASSESSMENTS. I HAVE:

___ BEEN A FOCAL POINT FOR GATHERING COMMENTS FOR ADP ASSESSMENTS.
___ PARTICIPATED IN THE ACTUAL WRITING OF AN ADP ASSESSMENT.
___ PROVIDED WRITTEN COMMENTS TO SUPPORT THE ASSESSMENT OF MORE THAN ONE ADP.
___ PROVIDED WRITTEN COMMENTS TO SUPPORT THE ASSESSMENT OF JUST ONE ADP.
___ NOT PERSONALLY PROVIDED WRITTEN COMMENTS, BUT HAVE PARTICIPATED IN THE OFFICE ASSESSMENT OF AN ADP.
___ NOT PARTICIPATED IN AN ASSESSMENT, BUT AM KNOWLEDGEABLE OF THE ADP ASSESSMENT REQUIREMENT.
___ NOT PARTICIPATED IN AN ASSESSMENT, AND AM ONLY VAGUELY AWARE OF THE ADP ASSESSMENT REQUIREMENT.
___ NOT HEARD OF THE ADP ASSESSMENT REQUIREMENT BEFORE TODAY.

THE REQUIREMENT FOR PRODUCT DIVISIONS TO ASSESS ADVANCED DEVELOPMENT PROGRAMS (ADP) CONDUCTED BY THE LABORATORIES WAS ESTABLISHED BY HQ AFSC IN DEC 1975. ONE GOAL OF THIS POLICY WAS TO INCREASE THE TRANSFER OF ADT TECHNOLOGY TO SYSTEM APPLICATION.

IN MAR 1974, A STUDY WHICH ADDRESSED THE TRANSFER OF TECHNOLOGY FROM FEDERAL LABORATORIES WAS CONDUCTED BY THE SYRACUSE UNIVERSITY RESEARCH CORP. FOR THE NATIONAL SCIENCE FOUNDATION. ONE CONCLUSION OF THE STUDY GROUP WAS THAT THE OCCURRENCE OF THE FOLLOWING EVENTS GREATLY ENHANCES THE TRANSFER ABILITY OF A TECHNOLOGY.

(1) CONDUCT OF PLANNING ACTIVITIES WHICH SERVE TO EXPOSE POTENTIAL PROBLEMS BEFORE THEY BECOME SERIOUS.

(2) THE ESTABLISHMENT OF A FORUM WITHIN WHICH PROBLEMS MAY BE RESOLVED AS THEY COME ALONG.

(3) THE EMERGENCE OF STRONG MANUFACTURER (e.g., PRODUCT DIVISION) SUPPORT OF A TECHNOLOGY RESULTING IN A BALANCE BETWEEN "TECHNOLOGY PUSH" AND "DEMAND PULL."

(4) ESTABLISH THAT THE TECHNOLOGY IS SUFFICIENTLY MATURE SO THAT THOSE INVOLVED CAN BE THAT THE REMAINING TECHNICAL AND COST BARRIERS ARE SOLUBLE.

(5) THE EXISTANCE OF AN EARLY INFORMATIONAL LINKAGE BETWEEN THE INNOVATOR (e.g., THE LABORATORY) AND THE NEEDER (e.g., THE PRODUCT DIVISION AND/OR THE USER).

6. PLEASE INDICATE THE EXTENT THAT YOU AGREE OR DISAGREE WITH THE STATEMENT THAT THE ADP ASSESSMENT POLICY WILL ENCOURAGE THE OCCURRENCE OF SUCH EVENTS.

	STRONGLY DISAGREE	DISAGREE	INCLINED TO DISAGREE	UNDECIDED	INCLINED TO AGREE	AGREE	STRONGLY AGREE
(1) PLANNING ACTIVITIES WHICH MAY EXPOSE PROBLEMS	___	___	___	___	___	___	___
(2) PROVIDE A FORUM FOR PROBLEM RESOLUTION	___	___	___	___	___	___	___
(3) STRONG PRODUCT DIVISION SUPPORT	___	___	___	___	___	___	___
(4) ESTABLISH THAT TECHNOLOGY IS MATURE	___	___	___	___	___	___	___
(5) ESTABLISH AN EARLY INFORMATIONAL LINKAGE	___	___	___	___	___	___	___

USE REVERSE FOR COMMENTS.

OTHER STUDIES SPONSORED BY THE NATIONAL SCIENCE FOUNDATION HAVE IDENTIFIED THE FOLLOWING FACTORS AS TYPICAL BARRIERS TO TECHNOLOGY TRANSFER BETWEEN AGENCIES: (1) INERTIA BARRIERS, (2) LACK OF AN INCENTIVE STRUCTURE, (3) COST BARRIERS, (4) COMMUNICATION BARRIERS, (5) TIME BARRIERS, (6) GEOGRAPHIC DISTANCE, (7) NONEXISTENT TRANSFER MANAGEMENT STRUCTURE, (8) TECHNOLOGY BARRIERS.

IN THE NEXT TWO QUESTIONS PLEASE INDICATE THE EXTENT THAT YOU AGREE OR DISAGREE WITH THE STATEMENT THAT A GIVEN FACTOR REPRESENTS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.

7. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, THE FOLLOWING FACTORS REPRESENTED A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.

	STRONGLY DISAGREE	DISAGREE	INCLINED TO DISAGREE	UNDECIDED	INCLINED TO AGREE	AGREE	STRONGLY AGREE
(1) INERTIA BARRIERS	___	___	___	___	___	___	___
(2) LACK OF INCENTIVE STRUCTURE	___	___	___	___	___	___	___
(3) COST BARRIERS	___	___	___	___	___	___	___
(4) COMMUNICATION BARRIERS	___	___	___	___	___	___	___
(5) TIME BARRIERS	___	___	___	___	___	___	___
(6) GEOGRAPHIC DISTANCE	___	___	___	___	___	___	___
(7) TRANSFER MANAGEMENT STRUCTURE	___	___	___	___	___	___	___
(8) TECHNOLOGY BARRIERS	___	___	___	___	___	___	___

COMMENTS:

8. NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT, THE FOLLOWING FACTORS WILL REPRESENT (OR "STILL REPRESENT") A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.

	STRONGLY DISAGREE	DISAGREE	INCLINED TO DISAGREE	UNDECIDED	INCLINED TO AGREE	AGREE	STRONGLY AGREE
(1) INERTIA BARRIERS	___	___	___	___	___	___	___
(2) LACK OF INCENTIVE STRUCTURE	___	___	___	___	___	___	___
(3) COST BARRIERS	___	___	___	___	___	___	___
(4) COMMUNICATION BARRIERS	___	___	___	___	___	___	___
(5) TIME BARRIERS	___	___	___	___	___	___	___
(6) GEOGRAPHIC DISTANCE	___	___	___	___	___	___	___
(7) TRANSFER MANAGEMENT STRUCTURE	___	___	___	___	___	___	___
(8) TECHNOLOGY BARRIERS	___	___	___	___	___	___	___

COMMENTS:

ONE GOAL OF THE ADP ASSESSMENT POLICY IS TO INCREASE DIALOGUE AND COMMUNICATION BETWEEN THE PRODUCT DIVISIONS AND LABORATORIES. THE NEXT SET OF QUESTIONS IS DESIGNED TO MEASURE HOW WELL THIS GOAL IS BEING ACHIEVED.

9. BELOW IS A LIST OF ADVANCED DEVELOPMENT PROGRAMS/PROJECTS EITHER BEING CONSIDERED OR CURRENTLY ONGOING IN THE LABORATORIES. PLEASE PLACE A CHECK MARK BESIDE A PROGRAM/PROJECT IF YOU LEARNED OF IT BECAUSE OF THE ADP ASSESSMENT POLICY/ACTIVITY.

NOTE: THE ORIGNIAL INTERVIEW SCHEDULE CONTAINED A LIST OF FIFTEEN ADVANCED DEVELOPMENT TECHNOLOGY PROGRAMS. THIS LIST HAS BEEN DELETED IN ORDER TO PRESERVE THE ANONYMITY OF THE LABORATORIES AND PRODUCT DIVISIONS VISITED.

10. CAN YOU THINK OF ANY OTHER ADVANCED DEVELOPMENT PROGRAMS/PROJECTS THAT YOU NOW KNOW ABOUT, BUT PROBABLY WOULD NOT HAVE LEARNED OF IF THE ADP ASSESSMENT POLICY/ACTIVITY HAD NOT OCCURRED?

____YES ____NO

IF MORE THAN ONE, ABOUT HOW MANY?

11. WHAT IS YOUR BEST ESTIMATE OF THE PERCENT OF YOUR WORKING TIME THAT WAS SPENT COMMUNICATING WITH PERSONNEL IN THE AGENCIES LISTED BELOW REGARDING NEW ADPs BEFORE THE ADP ASSESSMENT REQUIREMENT WENT INTO EFFECT?

___ (1) HIGHER HEADQUARTERS

___ (2) PRODUCT DIVISIONS

___ (3) LABORATORIES

___ (4) AFLC

___ (5) OPERATIONAL COMMANDS

12. WHAT IS YOUR BEST ESTIMATE OF THE PERCENT OF YOUR WORKING TIME THAT IS OR WILL BE SPENT COMMUNICATING WITH PERSONNEL IN THE AGENCIES LISTED BELOW REGARDING NEW ADPs NOW THAT THE ADP ASSESSMENT REQUIREMENT IS IN EFFECT?

___ (1) HIGHER HEADQUARTERS

___ (2) PRODUCT DIVISIONS

___ (3) LABORATORIES

___ (4) AFLC

___ (5) OPERATIONAL COMMANDS

13. HOW MUCH OF YOUR WORKING TIME SHOULD BE SPENT COMMUNICATING WITH PERSONNEL IN THE LABORATORY (PRODUCT DIVISION) IN ORDER FOR YOU TO STAY AWARE OF STATUS OF ADVANCED DEVELOPMENT PROGRAMS (SYSTEMS) WHICH ARE RELEVANT TO YOUR JOB?

_____%

14. DO YOU THINK THAT THE ADP ASSESSMENT POLICY WILL IMPROVE THE DIALOGUE BETWEEN YOURSELF AND THE PRODUCT DIVISION (LABORATORY)?

___ (1) YES

___ (2) NO

COMMEN

THE HQ AFSC GUIDELINES FOR PERFORMING THE ASSESSMENT OF A NEW ADP REQUIRES SEVERAL ITEMS TO BE CONSIDERED: PAYOFF OF THE ADP, THE FEASIBILITY OF THE SCHEDULE OF THE NEW ADP, THE COMPATIBILITY OF THE SCHEDULE OF THE NEW ADP WITH SCHEDULES OF PROBABLE APPLICATIONS, REALISTIC COST ESTIMATES, PRIORITY, ISSUES/CONFLICTS, DECISION OPTIONS, & RECOMMENDATIONS.

15a. IF YOU WORK IN A LABORATORY, HOW DIFFICULT IS IT (OR "WOULD IT BE") FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON EACH OF THE FOLLOWING ITEMS TO INCLUDE IN THE TECHNOLOGY PROGRAM PLAN?

	PAYOFF	SCHEDULES	ADP COST ESTIMATES	PRIORITY	ALTERNATE APPROACHES
VIRTUALLY IMPOSSIBLE	____	____	____	____	____
VERY DIFFICULT	____	____	____	____	____
SOMEWHAT DIFFICULT	____	____	____	____	____
NEITHER DIFFICULT NOR EASY	____	____	____	____	____
SOMEWHAT EASY	____	____	____	____	____
EASY	____	____	____	____	____
VERY EASY	____	____	____	____	____

COMMENTS:

15b. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?

____ YES ____ NO

COMMENTS:

16a. IF YOU WORK IN A PRODUCT DIVISION, HOW DIFFICULT IS IT (OR "WOULD IT BE") FOR YOU TO PERFORM WHAT YOU FEEL IS A RELIABLE ASSESSMENT OF AN ADP WITH RESPECT TO EACH OF THE FOLLOWING ITEMS?

	PAYOFF	SCHEDULES	ADP COST ESTIMATES	PRIORITY	DECISION OPTIONS
VIRTUALLY IMPOSSIBLE	____	____	____	____	____
VERY DIFFICULT	____	____	____	____	____
SOMEWHAT DIFFICULT	____	____	____	____	____
NEITHER DIFFICULT NOR EASY	____	____	____	____	____
SOMEWHAT EASY	____	____	____	____	____
EASY	____	____	____	____	____
VERY EASY	____	____	____	____	____

COMMENTS:

16b. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?

____ YES ____ NO

COMMENTS:

17. ANOTHER GOAL OF THE ADP ASSESSMENT POLICY IS TO INCREASE THE RESPONSIVENESS OF THE LABORATORIES TO THE PRODUCT DIVISIONS WITH RESPECT TO THE CONDUCT OF ADVANCED DEVELOPMENT PROGRAMS. PLEASE INDICATE YOUR THOUGHT ON THE DEGREE OF RESPONSIVENESS THAT SHOULD EXIST AND WHAT WILL EXIST NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT.

WHAT SHOULD BE	WHAT WILL BE	
____	____	(1) NONRESPONSIVE
____	____	(2) NEITHER RESPONSIVE NOR NONRESPONSIVE
____	____	(3) TO A SMALL EXTENT RESPONSIVE
____	____	(4) SOMEWHAT RESPONSIVE
____	____	(5) FOR THE MOST PART RESPONSIVE
____	____	(6) VERY RESPONSIVE
____	____	(7) EXCEEDINGLY RESPONSIVE

18. THE ADP ASSESSMENT POLICY IS A GOOD IDEA.

___ (1) STRONGLY DISAGREE

___ (2) DISAGREE

___ (3) INCLINED TO DISAGREE

___ (4) UNDECIDED

___ (5) INCLINED TO AGREE

___ (6) AGREE

___ (7) STRONGLY AGREE

COMMENTS:

INCREASING INSTITUTIONAL MOTIVATION AND THE ESTABLISHMENT OF A TECHNOLOGY TRANSFER AGENCY HAVE BEEN IDENTIFIED BY NON-DOD STUDIES AS NECESSARY ACTIONS REQUIRED TO IMPROVE THE TRANSFER OF TECHNOLOGY FROM AN INNOVATING ORGANIZATION TO THE USER. BELOW ARE SOME IDEAS WHICH MIGHT BE USED WITHIN THE AIR FORCE TO ACCOMPLISH THESE TWO OBJECTIVES.

(1) HAVE THE PRODUCT DIVISIONS ANNUALLY RATE THE LABORATORIES WITH RESPECT TO GENERATING TRANSFERABLE TECHNOLOGY.

(2) HAVE THE LABORATORIES ANNUALLY RATE THE PRODUCT DIVISIONS WITH RESPECT TO USING THE TECHNOLOGY THAT THE LABORATORIES GENERATE.

(3) BOTH (1) AND (2).

(4) SOMEHOW MAKE FUNDING FOR FUTURE ADPs CONDUCTED BY THE LABORATORIES CONTINGENT UPON THE COMPLETION OF TECHNOLOGY TRANSFER IN THE PAST.

(5) ESTABLISH A TECHNOLOGY TRANSFER AGENCY STAFFED BY PROFESSIONALS IN TECHNOLOGY TRANSFER. THIS AGENCY WOULD DEVELOP A STRATEGIC PLAN, STRUCTURE ORGANIZATIONAL RELATIONS, ACT AS A PRODUCT ADVOCATE, AND INTERVENE AT KEY POINTS (WITH FUNDS IF NECESSARY). THE AGENCY WOULD ALSO HAVE TO BE WILLING TO RISK FAILURE AND NOT BE UNDULY CRITICIZED WHEN A NEW TECHNOLOGY PROGRAM DOES NOT PROVE SUCCESSFUL.

19. PLEASE INDICATE THE EXTENT THAT YOU AGREE OR DISAGREE THAT THESE IDEAS HAVE ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.

	STRONGLY DISAGREE	DISAGREE	INCLINED TO DISAGREE	UNDECIDED	INCLINED TO AGREE	AGREE	STRONGLY AGREE
(1) PRODUCT DIVISIONS RATE LABS	___	___	___	___	___	___	___
(2) LABS RATE PRODUCT DIVISIONS	___	___	___	___	___	___	___
(3) BOTH (1) AND (2)	___	___	___	___	___	___	___
(4) MAKE FUTURE FUNDING CONTINGENT PAST TRANSFERS	___	___	___	___	___	___	___
(5) ESTABLISH TECHNOLOGY TRANSFER AGENCY	___	___	___	___	___	___	___

USE REVERSE FOR COMMENTS.

DEFINITION OF

PROPOSED BARRIERS

(1) INERTIA BARRIERS

Product too different from what has been done in the past.

A predominant commitment to "current technology" rather than supporting advanced technology concepts and subsystem.

Uncertainty of internal predictions of cost, schedule, and performance.

(2) LACK OF AN INCENTIVE STRUCTURE

Advanced Development Program funding technique.

Discouragement of long term efforts.

Individual fear of being blamed for failure.

Lack of a laboratory performance evaluation system.

(3) COST BARRIERS

Unavailability of cost information critical to decision making.

Predicted ADP cost too high.

No way to evaluate expected "return-on-investment" of an ADP.

Excessive cost required to "re-engineer" an ADP product before it can be used in a system application.

Lack of funds to support an ADP, including contract funding.

(4) COMMUNICATION BARRIERS

Lack of coordination among various agencies or offices (e.g., staff with engineering, laboratories with product divisions, etc.).

Functional specialist have inadequate understanding of other function (e.g., engineering or laboratory or vice versa).

Customer needs cannot be easily translated into an ADP definition.

(5) TIME BARRIERS

Unavailability of schedule information critical to decision making.

Lack of sufficient calender time to complete ADP.

Conflict between time horizon of product division customers and the laboratories.

High risk of early obsolescence.

(6) GEOGRAPHIC DISTANCE

Distance between product division and laboratory.

Distance between ADP contractor and laboratory.

(7) NONEXISTENT TRANSFER MANAGEMENT STRUCTURE

Lack of clear procedures and policies for approving and/or reviewing an ADP.

Lack of a specific policy to insure transition of laboratory developed equipment to the product divisions.

Existence of a prevalent "NIH" syndrome.

No mechanism for the transfer of technical knowledge.

Limited mobility of individuals.

(8) TECHNOLOGY BARRIERS

Technology base not suitable for advanced development.

Unavailability of information critical to predicting the performance of an ADP product.

APPENDIX D

Interview Data

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

1. ARE YOU PRESENTLY ASSIGNED TO A	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. LABORATORY	17	44.7	IXXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXXX
B. PRODUCT DIVISION (STAFF ORGANIZATION)	3	7.9	IXXXX IXXXX
C. PRODUCT DIVISION (PROGRAM OFFICE)	0	0.0	I I
D. PRODUCT DIVISION (FUNCTIONAL ORGANIZATION)	14	36.8	IXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXX
E. OTHER	4	10.5	IXXXXX IXXXXX

COPY AVAILABLE TO DTIC DOES NOT PERMIT FULLY LEGIBLE REPRODUCTION

2. WHAT IS YOUR GRADE?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. CAPTAIN	2	5.3	IXXX IXXX
B. MAJOR	3	7.9	IXXXX IXXXX
C. LIEUTENANT COLONEL	4	10.5	IXXXXX IXXXXX
D. COLONEL	0	0.0	I I
E. GS 12	0	0.0	I I
F. GS 13	7	18.4	IXXXXXXXX IXXXXXXXX
G. GS 14	10	26.3	IXXXXXXXXXXX IXXXXXXXXXXX
H. GS 15	9	23.7	IXXXXXXXXXX IXXXXXXXXXX
I. GS 16 AND ABOVE	3	7.9	IXXX IXXX

3. HOW LONG HAVE YOU BEEN IN THE RESEARCH AND DEVELOPMENT FIELD?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. LESS THAN 1 YR	1	2.6	IXX IXX
B. 1 YR TO 4 YRS	2	5.3	IXXX IXXX
C. 4 YRS TO 8 YRS	3	7.9	IXXXX IXXXX
D. 8 YRS TO 12 YRS	4	10.5	IXXXXX IXXXXX
E. 12 YRS TO 16 YRS	7	18.4	IXXXXXXXX IXXXXXXXX
F. 16 YRS TO 20 YRS	2	5.3	IXXX IXXX
G. MORE THAN 20 YRS	19	50.0	IXXXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXXXX

APPENDIX C
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

4. HOW LONG HAVE YOU BEEN IN YOUR PRESENT WORK ASSIGNMENT?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. LESS THAN 6 MOS	4	10.5	IXXXXX
			IXXXXX
B. 6 MOS TO 2 YRS	10	26.3	IXXXXXXXXXX
			IXXXXXXXXXX
C. 2 YRS TO 4 YRS	10	26.3	IXXXXXXXXXX
			IXXXXXXXXXX
D. 4 YRS TO 6 YRS	2	5.3	IXXX
			IXXX
E. 6 YRS TO 8 YRS	6	15.8	IXXXXXXX
			IXXXXXXX
F. 8 YRS TO 12 YRS	2	5.3	IXXX
			IXXX
G. MORE THAN 12 YRS	4	10.5	IXXXXX
			IXXXXX

5. PRODUCT DIVISION ONLY - SELECT ONE STATEMENT SHOWING DEGREE YOU HAVE PARTICIPATED IN ADP ASSESSMENTS. I HAVE:	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. BEEN A FOCAL POINT FOR GATHERING COMMENTS FOR ADP ASSESSMENTS.	11	61.1	IXXXXXXXXXXXXXXXXXXXXXXXX
			IXXXXXXXXXXXXXXXXXXXXXXXX
B. PARTICIPATED IN THE ACTUAL WRITING OF AN ADP ASSESSMENT.	3	16.7	IXXXXXXX
			IXXXXXXX
C. PROVIDED WRITTEN COMMENTS TO SUPPORT MORE THAN ONE ADP ASSESSMENT.	3	16.7	IXXXXXXX
			IXXXXXXX
D. PROVIDED WRITTEN COMMENTS TO SUPPORT ONLY ONE ADP ASSESSMENT.	1	5.6	IXXX
			IXXX
E. WRITTEN NOTHING, BUT PARTICIPATED IN OFFICE ASSESSMENT OF AN ADP.	0	0.0	I
F. NOT PARTICIPATED, BUT AM KNOWLEDGEABLE OF POLICY.	0	0.0	I
G. NOT PARTICIPATED, AND AM ONLY VAGUELY AWARE OF POLICY.	0	0.0	I
H. NOT HEARD OF ADP ASSESSMENT REQUIREMENT BEFORE TODAY.	0	0.0	I

6A. THE ADP ASSESSMENT POLICY WILL ENCOURAGE PLANNING ACTIVITIES WHICH MAY EXPOSE PROBLEMS.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	0	0.0	I
B. DISAGREE	1	2.6	IXX
			IXX
C. INCLINED TO DISAGREE	6	15.8	IXXXXXXX
			IXXXXXXX
D. UNDECIDED	2	5.3	IXXX
			IXXX
E. INCLINED TO AGREE	11	28.9	IXXXXXXXXXXX
			IXXXXXXXXXXX
F. AGREE	9	23.7	IXXXXXXXXX
			IXXXXXXXXX
G. STRONGLY AGREE	9	23.7	IXXXXXXXXX
			IXXXXXXXXX

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

59. THE ADP ASSESSMENT POLICY WILL ENCOURAGE A FORUM FOR PROBLEM RESOLUTION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	1	2.6	IXX
B. DISAGREE	3	7.9	IXXXX
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX
D. UNDECIDED	2	5.3	IXXX
E. INCLINED TO AGREE	14	36.8	IXXXXXXXXXXXXXX
F. AGREE	8	21.1	IXXXXXXXXX
G. STRONGLY AGREE	5	13.2	IXXXXXX

60. THE ADP ASSESSMENT POLICY WILL ENCOURAGE STRONG PRODUCT DIVISION SUPPORT.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	1	2.6	IXX
B. DISAGREE	1	2.6	IXX
C. INCLINED TO DISAGREE	6	15.8	IXXXXXXX
D. UNDECIDED	2	5.3	IXXX
E. INCLINED TO AGREE	6	15.8	IXXXXXXX
F. AGREE	12	31.6	IXXXXXXXXXXXX
G. STRONGLY AGREE	10	26.3	IXXXXXXXXXX

COPY AVAILABLE TO DTIC DOES NOT PERMIT FULLY LEGIBLE REPRODUCTION

60. THE ADP ASSESSMENT POLICY WILL ENCOURAGE ESTABLISHING THAT THE TECHNOLOGY IS MATURE.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	1	2.6	IXX
B. DISAGREE	2	5.3	IXXX
C. INCLINED TO DISAGREE	6	15.8	IXXXXXXX
D. UNDECIDED	1	2.6	IXX
E. INCLINED TO AGREE	11	28.9	IXXXXXXXXXXX
F. AGREE	13	34.2	IXXXXXXXXXXXXX
G. STRONGLY AGREE	4	10.5	IXXXXX

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

6A. THE ADP ASSESSMENT POLICY WILL ENCOURAGE THE ESTABLISHMENT OF AN EARLY INFORMATIONAL LINK.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	0	0.0	
B. DISAGREE	0	0.0	
C. INCLINED TO DISAGREE	2	5.3	IXXX IXXX
D. UNDECIDED	1	2.6	IXX IXX
E. INCLINED TO AGREE	9	23.7	IXXXXXXXXXX IXXXXXXXXXX
F. AGREE	11	28.9	IXXXXXXXXXXXX IXXXXXXXXXXXX
G. STRONGLY AGREE	15	39.5	IXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXX

7A. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, INERTIA WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	1	2.6	IXX IXX
B. DISAGREE	3	7.9	IXXXX IXXXX
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX IXXXXXX
D. UNDECIDED	1	2.6	IXX IXX
E. INCLINED TO AGREE	11	28.9	IXXXXXXXXXXX IXXXXXXXXXXX
F. AGREE	6	15.8	IXXXXXXX IXXXXXXX
G. STRONGLY AGREE	11	28.9	IXXXXXXXXXXX IXXXXXXXXXXX

7B. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, A LACK OF AN INCENTIVE STRUCTURE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	4	10.5	IXXXXX IXXXXX
B. DISAGREE	7	18.4	IXXXXXXXXX IXXXXXXXXX
C. INCLINED TO DISAGREE	4	10.5	IXXXXX IXXXXX
D. UNDECIDED	3	7.9	IXXXX IXXXX
E. INCLINED TO AGREE	8	21.1	IXXXXXXXXX IXXXXXXXXX
F. AGREE	7	18.4	IXXXXXXX IXXXXXXX
G. STRONGLY AGREE	5	13.2	IXXXXXX IXXXXXX

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

7C. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, COST WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	1	2.6	IXX				
B. DISAGREE	4	10.5	IXXXXX				
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX				
D. UNDECIDED	4	10.5	IXXXXX				
E. INCLINED TO AGREE	12	31.6	IXXXXXXXXXXXX				
F. AGREE	9	23.7	IXXXXXXXXX				
G. STRONGLY AGREE	3	7.9	IXXXX				

7D. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, COMMUNICATION WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	1	2.6	IXX				
B. DISAGREE	4	10.5	IXXXXX				
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX				
D. UNDECIDED	0	0.0	I				
E. INCLINED TO AGREE	11	28.9	IXXXXXXXXXXX				
F. AGREE	11	28.9	IXXXXXXXXXXX				
G. STRONGLY AGREE	6	15.8	IXXXXXXX				

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

7E. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TIME WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	1	2.6	IXX				
B. DISAGREE	2	5.3	IXXX				
C. INCLINED TO DISAGREE	8	21.1	IXXXXXXXXX				
D. UNDECIDED	0	0.0	I				
E. INCLINED TO AGREE	8	21.1	IXXXXXXXXX				
F. AGREE	12	31.6	IXXXXXXXXXXXX				
G. STRONGLY AGREE	7	18.4	IXXXXXXXX				

7F. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, GEOGRAPHIC DISTANCE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	7	18.4	IXXXXXXXX IXXXXXXXX
B. DISAGREE	11	28.9	IXXXXXXXXXXX IXXXXXXXXXXX
C. INCLINED TO DISAGREE	7	18.4	IXXXXXXXXX IXXXXXXXXX
D. UNDECIDED	3	7.9	IXXX IXXX
E. INCLINED TO AGREE	7	18.4	IXXXXXXXX IXXXXXXXX
F. AGREE	2	5.3	IXXX IXXX
G. STRONGLY AGREE	1	2.6	IXX IXX

7G. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TRANSFER MANAGEMENT STRUCTURE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	2	5.3	IXXX IXXX
B. DISAGREE	3	7.9	IXXXX IXXXX
C. INCLINED TO DISAGREE	5	13.2	IXXXXX IXXXXX
D. UNDECIDED	3	7.9	IXXXXX IXXXXX
E. INCLINED TO AGREE	8	21.1	IXXXXXXXX IXXXXXXXX
F. AGREE	9	23.7	IXXXXXXXXX IXXXXXXXXX
G. STRONGLY AGREE	8	21.1	IXXXXXXXX IXXXXXXXX

7H. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TECHNOLOGY WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	4	10.5	IXXXXX IXXXXX
B. DISAGREE	9	23.7	IXXXXXXXXX IXXXXXXXXX
C. INCLINED TO DISAGREE	8	21.1	IXXXXXXXX IXXXXXXXX
D. UNDECIDED	1	2.6	IXX IXX
E. INCLINED TO AGREE	8	21.1	IXXXXXXXX IXXXXXXXX
F. AGREE	5	13.2	IXXXXXX IXXXXXX
G. STRONGLY AGREE	3	7.9	IXXXX IXXXX

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APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

8A. WITH THE ADP ASSESSMENT POLICY IN EFFECT, INERTIA WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	1	2.6	IXX				
			IXX				
B. DISAGREE	4	10.5	IXXXXX				
			IXXXXX				
C. INCLINED TO DISAGREE	10	26.3	IXXXXXXXXXX				
			IXXXXXXXXXX				
D. UNDECIDED	1	2.6	IXX				
			IXX				
E. INCLINED TO AGREE	12	31.6	IXXXXXXXXXXX				
			IXXXXXXXXXXX				
F. AGREE	5	13.2	IXXXXXX				
			IXXXXXX				
G. STRONGLY AGREE	5	13.2	IXXXXXX				
			IXXXXXX				

8B. WITH THE ADP ASSESSMENT POLICY IN EFFECT, LACK OF INCENTIVE STRUCTURE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	4	10.5	IXXXXX				
			IXXXXX				
B. DISAGREE	7	18.4	IXXXXXXXX				
			IXXXXXXXX				
C. INCLINED TO DISAGREE	9	23.7	IXXXXXXXXX				
			IXXXXXXXXX				
D. UNDECIDED	6	15.8	IXXXXXXX				
			IXXXXXXX				
E. INCLINED TO AGREE	6	15.8	IXXXXXXX				
			IXXXXXXX				
F. AGREE	4	10.5	IXXXXX				
			IXXXXX				
G. STRONGLY AGREE	2	5.3	IXXX				
			IXXX				

8C. WITH THE ADP ASSESSMENT POLICY IN EFFECT, COST WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	1	2.6	IXX				
			IXX				
B. DISAGREE	6	15.8	IXXXXXXX				
			IXXXXXXX				
C. INCLINED TO DISAGREE	10	26.3	IXXXXXXXXXX				
			IXXXXXXXXXX				
D. UNDECIDED	4	10.5	IXXXXX				
			IXXXXX				
E. INCLINED TO AGREE	9	23.7	IXXXXXXXXX				
			IXXXXXXXXX				
F. AGREE	6	15.8	IXXXXXXX				
			IXXXXXXX				
G. STRONGLY AGREE	2	5.3	IXXX				
			IXXX				

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80. WITH THE ADP ASSESSMENT POLICY IN EFFECT, COMMUNICATION WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	2	5.3	Ixxx Ixxx
B. DISAGREE	17	44.7	Ixxxxxxxxxxxxxxxxx Ixxxxxxxxxxxxxxxxx
C. INCLINED TO DISAGREE	6	15.8	Ixxxxxxx Ixxxxxxx
D. UNDECIDED	3	7.9	Ixxxx Ixxxx
E. INCLINED TO AGREE	6	15.8	Ixxxxxxx Ixxxxxxx
F. AGREE	2	5.3	Ixxx Ixxx
G. STRONGLY AGREE	2	5.3	Ixxx Ixxx

81. WITH THE ADP ASSESSMENT POLICY IN EFFECT, TIME WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	2	5.3	Ixxx Ixxx
B. DISAGREE	4	10.5	Ixxxxx Ixxxxx
C. INCLINED TO DISAGREE	10	26.3	Ixxxxxxxxxx Ixxxxxxxxxx
D. UNDECIDED	3	7.9	Ixxxx Ixxxx
E. INCLINED TO AGREE	6	15.8	Ixxxxxxx Ixxxxxxx
F. AGREE	9	23.7	Ixxxxxxxxx Ixxxxxxxxx
G. STRONGLY AGREE	4	10.5	Ixxxxx Ixxxxx

82. WITH THE ADP ASSESSMENT POLICY IN EFFECT, GEOGRAPHIC DISTANCE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	7	18.4	Ixxxxxxxx Ixxxxxxxx
B. DISAGREE	13	34.2	Ixxxxxxxxxxxxxx Ixxxxxxxxxxxxxx
C. INCLINED TO DISAGREE	5	13.2	Ixxxxxx Ixxxxxx
D. UNDECIDED	6	15.8	Ixxxxxxx Ixxxxxxx
E. INCLINED TO AGREE	5	13.2	Ixxxxxx Ixxxxxx
F. AGREE	2	5.3	Ixxx Ixxx
G. STRONGLY AGREE	0	0.0	I I

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7G. WITH ADP ASSESSMENT POLICY IN EFFECT, TRANSFER MANAGEMENT STRUCTURE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	3	7.9	IXXXX
B. DISAGREE	10	26.3	IXXXXXXXXXX
C. INCLINED TO DISAGREE	12	31.6	IXXXXXXXXXXXX
D. UNDECIDED	1	2.6	IXX
E. INCLINED TO AGREE	6	15.8	IXXXXXXX
F. AGREE	6	15.8	IXXXXXXX
G. STRONGLY AGREE	0	0.0	I

7H. WITH THE ADP ASSESSMENT POLICY IN EFFECT, TECHNOLOGY WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	5	13.2	IXXXXXX
B. DISAGREE	12	31.6	IXXXXXXXXXXXX
C. INCLINED TO DISAGREE	13	34.2	IXXXXXXXXXXXXX
D. UNDECIDED	1	2.6	IXX
E. INCLINED TO AGREE	5	13.2	IXXXXXX
F. AGREE	1	2.6	IXX
G. STRONGLY AGREE	1	2.6	IXX

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8. I HAVE HEARD OF THE FOLLOWING NUMBER OF ADVANCED DEVELOPMENT PROGRAMS/ PROJECTS BECAUSE OF THE ADP ASSESSMENT POLICY/ACTIVITY.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A.	12	38.7	IXXXXXXXXXXXXXXXX
B. 1	5	16.1	IXXXXXXX
C. 2	4	12.9	IXXXXXX
D. 3	3	9.7	IXXXX
E. 4	3	9.7	IXXXX
F. MORE THAN 4	4	12.9	IXXXXXX

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

1.A. ARE THERE OTHERS YOU NOW KNOW ABOUT, BUT PROBABLY WOULD NOT HAVE LEARNED OF IF ADP ASSESSMENT POLICY/ACTIVITY HAD NOT OCCURRED?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. YES	12	38.7	IXXXXXXXXXXXXXXXX
B. NO	19	61.3	IXXXXXXXXXXXXXXX

11B. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH PRODUCT DIVISIONS?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	11	30.6	IXXXXXXXXXXXX
B. 1 TO 3	11	30.6	IXXXXXXXXXXXX
C. 4 TO 7	8	22.2	IXXXXXXXXX
D. 8 TO 11	2	5.6	IXXX
E. 12 TO 15	1	2.8	IXX
F. 16 TO 20	1	2.8	IXX
G. MORE THAN 20	2	5.6	IXXX

11C. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH LABORATORIES?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	7	19.4	IXXXXXXXX
B. 1 TO 3	8	22.2	IXXXXXXXXX
C. 4 TO 7	10	27.8	IXXXXXXXXXXX
D. 8 TO 11	4	11.1	IXXXXX
E. 12 TO 15	2	5.6	IXXX
F. 16 TO 20	2	5.6	IXXX
G. MORE THAN 20	3	8.3	IXXXX

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11D. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH AFLC?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	22	61.1	IXXXXXXXXXXXXXXXXXXXXXXXX
B. 1 TO 3	11	30.6	IXXXXXXXXXXXX
C. 4 TO 7	2	5.6	IXXX
D. 8 TO 11	1	2.8	IXX
E. 12 TO 15	0	0.0	I
F. 16 TO 20	0	0.0	I
G. MORE THAN 20	0	0.0	I

11E. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH OPERATIONAL COMMANDS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	17	47.2	IXXXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXXXX
B. 1 TO 3	11	30.6	IXXXXXXXXXXXX IXXXXXXXXXXXX
C. 4 TO 7	4	11.1	IXXXXX IXXXXX
D. 8 TO 11	2	5.6	IXXX IXXX
E. 12 TO 15	0	0.0	I I
F. 16 TO 20	1	2.8	IXX IXX
G. MORE THAN 20	1	2.8	IXX IXX

12A. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH HIGHER HEADQUARTERS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	9	25.0	IXXXXXXXXXX IXXXXXXXXXX
B. 1 TO 3	9	25.0	IXXXXXXXXXX IXXXXXXXXXX
C. 4 TO 7	6	16.7	IXXXXXXX IXXXXXXX
D. 8 TO 11	5	13.9	IXXXXXX IXXXXXX
E. 12 TO 15	2	5.6	IXXX IXXX
F. 16 TO 20	1	2.8	IXX IXX
G. MORE THAN 20	4	11.1	IXXXXX IXXXXX

12B. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH PRODUCT DIVISIONS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	7	19.4	IXXXXXXXX IXXXXXXXX
B. 1 TO 3	7	19.4	IXXXXXXXX IXXXXXXXX
C. 4 TO 7	10	27.8	IXXXXXXXXXXX IXXXXXXXXXXX
D. 8 TO 11	8	22.2	IXXXXXXXXX IXXXXXXXXX
E. 12 TO 15	1	2.8	IXX IXX
F. 16 TO 20	0	0.0	I I
G. MORE THAN 20	3	8.3	IXXXX IXXXX

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12C. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH LABORATORIES?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	4	11.1	IXXXXX
			IXXXXX
B. 1 TO 3	6	16.7	IXXXXXXX
			IXXXXXXX
C. 4 TO 7	11	30.6	IXXXXXXXXXXXX
			IXXXXXXXXXXXX
D. 8 TO 11	5	13.9	IXXXXXX
			IXXXXXX
E. 12 TO 15	4	11.1	IXXXXX
			IXXXXX
F. 16 TO 20	4	11.1	IXXXXX
			IXXXXX
G. MORE THAN 20	2	5.6	IXXX
			IXXX

12D. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH AFLC?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	18	50.0	IXXXXXXXXXXXXXXXXXX
			IXXXXXXXXXXXXXXXXXX
B. 1 TO 3	15	41.7	IXXXXXXXXXXXXXXXX
			IXXXXXXXXXXXXXXXX
C. 4 TO 7	2	5.6	IXXX
			IXXX
D. 8 TO 11	1	2.8	IXX
			IXX
E. 12 TO 15	0	0.0	I
			I
F. 16 TO 20	0	0.0	I
			I
G. MORE THAN 20	0	0.0	I
			I

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12E. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH OPERATIONAL COMMANDS?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. 0	12	33.3	IXXXXXXXXXXXXX
			IXXXXXXXXXXXXX
B. 1 TO 3	13	36.1	IXXXXXXXXXXXXXX
			IXXXXXXXXXXXXXX
C. 4 TO 7	7	19.4	IXXXXXXXX
			IXXXXXXXX
D. 8 TO 11	2	5.6	IXXX
			IXXX
E. 12 TO 15	0	0.0	I
			I
F. 16 TO 20	0	0.0	I
			I
G. MORE THAN 20	2	5.6	IXXX
			IXXX

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

13. HOW MUCH OF YOUR WORKING TIME SHOULD BE SPENT COMMUNICATING WITH PERSONNEL IN THE LABORATORY (PRODUCT DIVISION)?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. [illegible]	1	5.9	I
B. 1 TO 3	1	2.8	IXX
C. 4 TO 7	10	27.8	IXXXXXXXXXXXX
D. 8 TO 11	13	36.1	IXXXXXXXXXXXXXX
E. 12 TO 15	2	5.6	IXXX
F. 16 TO ?	8	22.2	IXXXXXXXXX
G. MORE THAN 20	2	5.6	IXXX

14. DO YOU THINK THAT THE ADP POLICY WILL IMPROVE THE DIALOGUE BETWEEN YOURSELF AND THE PRODUCT DIVISION OR LABORATORY?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. YES	31	83.8	IXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
B. NO	6	16.2	IXXXXXXX

15A1. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON PAYOFF?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	1	5.9	IXXX
B. VERY DIFFICULT	3	17.6	IXXXXXXXX
C. SOMEWHAT DIFFICULT	2	11.8	IXXXXX
D. NEITHER DIFFICULT NOR EASY	1	5.9	IXXX
E. SOMEWHAT EASY	5	29.4	IXXXXXXXXXXX
F. EASY	2	11.8	IXXXXX
G. VERY EASY	3	17.6	IXXXXXXXX

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1:42. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON SCHEDULES?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	0	0.0	
B. VERY DIFFICULT	1	5.9	IXXX
C. SOMEWHAT DIFFICULT	3	17.6	IXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	3	17.6	IXXXXXXXX
E. SOMEWHAT EASY	8	47.1	IXXXXXXXXXXXXXXXX
F. EASY	2	11.8	IXXXXX
G. VERY EASY	0	0.0	

1:43. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON AOP COST ESTIMATES?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	0	0.0	
B. VERY DIFFICULT	3	17.6	IXXXXXXXX
C. SOMEWHAT DIFFICULT	6	35.3	IXXXXXXXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	3	17.6	IXXXXXXXX
E. SOMEWHAT EASY	4	23.5	IXXXXXXXXX
F. EASY	1	5.9	IXXX
G. VERY EASY	0	0.0	

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1:44. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON PRIORITY?

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	4	23.5	IXXXXXXXXX
B. VERY DIFFICULT	1	5.9	IXXX
C. SOMEWHAT DIFFICULT	6	35.3	IXXXXXXXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	3	17.6	IXXXXXXXX
E. SOMEWHAT EASY	3	17.6	IXXXXXXXX
F. EASY	0	0.0	
G. VERY EASY	0	0.0	

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14A5. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON ALTERNATE APPROACHES?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	0	0.0	
B. VERY DIFFICULT	2	11.8	IXXXXX IXXXXX
C. SOMEWHAT DIFFICULT	3	17.6	IXXXXXXXX IXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	6	35.3	IXXXXXXXXXXXXXX IXXXXXXXXXXXXXX
E. SOMEWHAT EASY	5	29.4	IXXXXXXXXXXX IXXXXXXXXXXX
F. EASY	1	5.9	IXXX IXXX
G. VERY EASY	0	0.0	

14B. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. YES	9	64.3	IXXXXXXXXXXXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXXXXXXXXXXX
B. NO	5	35.7	IXXXXXXXXXXXXXX IXXXXXXXXXXXXXX

14A1. (PRODUCT DIVISION) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM WHAT YOU FEEL IS A RELIABLE AOP ASSESSMENT WITH RESPECT TO PAYOFF?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	0	0.0	
B. VERY DIFFICULT	4	19.0	IXXXXXXXX IXXXXXXXX
C. SOMEWHAT DIFFICULT	4	19.0	IXXXXXXXX IXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	3	14.3	IXXXXXX IXXXXXX
E. SOMEWHAT EASY	2	9.5	IXXXX IXXXX
F. EASY	8	38.1	IXXXXXXXXXXXXXXXX IXXXXXXXXXXXXXXXX
G. VERY EASY	0	0.0	

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		RESPONSES		DISTRIBUTION OF RESPONSES
10A2.	(PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO SCHEDULES?	NO.	%	0% 25% 50% 75% 100%
	A. VIRTUALLY IMPOSSIBLE	1	4.8	Ixx
	B. VERY DIFFICULT	2	9.5	Ixxxx
	C. SOMEWHAT DIFFICULT	8	38.1	Ixxxxxxxxxxxxxxx
	D. NEITHER DIFFICULT NOR EASY	3	14.3	Ixxxxxx
	E. SOMEWHAT EASY	4	19.0	Ixxxxxxxx
	F. EASY	3	14.3	Ixxxxxx
	G. VERY EASY	0	0.0	I

		RESPONSES		DISTRIBUTION OF RESPONSES
10A3.	(PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO ADP COST ESTIMATES?	NO.	%	0% 25% 50% 75% 100%
	A. VIRTUALLY IMPOSSIBLE	1	4.8	Ixx
	B. VERY DIFFICULT	7	33.3	Ixxxxxxxxxxxxxx
	C. SOMEWHAT DIFFICULT	5	23.8	Ixxxxxxxxxx
	D. NEITHER DIFFICULT NOR EASY	4	19.0	Ixxxxxxxx
	E. SOMEWHAT EASY	3	14.3	Ixxxxxx
	F. EASY	1	4.8	Ixx
	G. VERY EASY	0	0.0	I

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		RESPONSES		DISTRIBUTION OF RESPONSES
10A4.	(PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO PRIORITY?	NO.	%	0% 25% 50% 75% 100%
	A. VIRTUALLY IMPOSSIBLE	1	4.8	Ixx
	B. VERY DIFFICULT	4	19.0	Ixxxxxxxx
	C. SOMEWHAT DIFFICULT	4	19.0	Ixxxxxxxx
	D. NEITHER DIFFICULT NOR EASY	4	19.0	Ixxxxxxxx
	E. SOMEWHAT EASY	3	14.3	Ixxxxxx
	F. EASY	4	19.0	Ixxxxxxxx
	G. VERY EASY	1	4.8	Ixx

APPENDIX D
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16AF. (PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO DECISION OPTIONS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. VIRTUALLY IMPOSSIBLE	0	0.0	
B. VERY DIFFICULT	1	4.8	IXX
C. SOMEWHAT DIFFICULT	6	28.6	IXXXXXXXXXXXX
D. NEITHER DIFFICULT NOR EASY	8	38.1	IXXXXXXXXXXXXXXXX
E. SOMEWHAT EASY	3	14.3	IXXXXXX
F. EASY	2	9.5	IXXXXX
G. VERY EASY	1	4.8	IXX

16B. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. YES	13	65.0	IXXXXXXXXXXXXXXXXXXXXXXXXX
B. NO	7	35.0	IXXXXXXXXXXXXX

17A. PLEASE INDICATE YOUR THOUGHT ON THE DEGREE OF RESPONSIVENESS THAT SHOULD EXIST NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. NONRESPONSIVE	0	0.0	
B. NEITHER RESPONSIVE NOR NONRESPONSIVE	0	0.0	
C. TO A SMALL EXTENT RESPONSIVE	0	0.0	
D. SOMEWHAT RESPONSIVE	7	18.4	IXXXXXXXX
E. FOR THE MOST PART RESPONSIVE	13	34.2	IXXXXXXXXXXXXX
F. VERY RESPONSIVE	13	34.2	IXXXXXXXXXXXXX
G. EXCEEDINGLY RESPONSIVE	5	13.2	IXXXXXX

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APPENDIX D
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17B. PLEASE INDICATE YOUR THOUGHT ON THE DEGREE OF RESPONSIVENESS THAT WILL EXIST NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. NONRESPONSIVE	1	2.6	IXX
B. NEITHER RESPONSIVE NOR NONRESPONSIVE	4	10.5	IXXXXX
C. TO A SMALL EXTENT RESPONSIVE	4	10.5	IXXXXX
D. SOMEWHAT RESPONSIVE	11	28.9	IXXXXXXXXXXX
E. FOR THE MOST PART RESPONSIVE	13	34.2	IXXXXXXXXXXXXX
F. VERY RESPONSIVE	4	10.5	IXXXXX
G. EXCEEDINGLY RESPONSIVE	1	2.6	IXX

17C. THE ADP ASSESSMENT POLICY IS A GOOD IDEA.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	1	2.6	IXX
B. DISAGREE	1	2.6	IXX
C. INCLINED TO DISAGREE	0	0.0	I
D. UNDECIDED	2	5.3	IXXX
E. INCLINED TO AGREE	7	18.4	IXXXXXXXX
F. AGREE	16	42.1	IXXXXXXXXXXXXXXXX
G. STRONGLY AGREE	11	28.9	IXXXXXXXXXXX

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17A. THE TYPE OF PRODUCT DIVISIONS RATING LABS HAS ENOUGH MERIT TO WARRANT FURTHER CONSIDERATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	2	5.3	IXXX
B. DISAGREE	9	23.7	IXXXXXXXXX
C. INCLINED TO DISAGREE	4	10.5	IXXXXX
D. UNDECIDED	2	5.3	IXXX
E. INCLINED TO AGREE	8	21.1	IXXXXXXXX
F. AGREE	10	26.3	IXXXXXXXXXX
G. STRONGLY AGREE	3	7.9	IXXXX

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

198. THE IDEA OF LABS RATING PRODUCT DIVISIONS HAS ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	2	5.3	IXXX				
			IXXX				
B. DISAGREE	11	28.9	IXXXXXXXXXXXX				
			IXXXXXXXXXXXX				
C. INCLINED TO DISAGREE	4	10.5	IXXXXX				
			IXXXXX				
D. UNDECIDED	1	2.6	IXX				
			IXX				
E. INCLINED TO AGREE	12	31.6	IXXXXXXXXXXXXX				
			IXXXXXXXXXXXXX				
F. AGREE	6	15.8	IXXXXXXX				
			IXXXXXXX				
G. STRONGLY AGREE	2	5.3	IXXX				
			IXXX				

199. THE IDEA OF BOTH THE LABS AND PRODUCT DIVISIONS RATING EACH OTHER HAS ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	3	7.9	IXXXX				
			IXXXX				
B. DISAGREE	8	21.1	IXXXXXXXXX				
			IXXXXXXXXX				
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX				
			IXXXXXX				
D. UNDECIDED	2	5.3	IXXX				
			IXXX				
E. INCLINED TO AGREE	11	28.9	IXXXXXXXXXXX				
			IXXXXXXXXXXX				
F. AGREE	7	18.4	IXXXXXXXX				
			IXXXXXXXX				
G. STRONGLY AGREE	2	5.3	IXXX				
			IXXX				

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200. THE IDEA TO MAKE FUTURE FUNDING CONTINGENT ON PAST TRANSFERS HAS ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.

	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% I	25% I	50% I	75% I	100% I
A. STRONGLY DISAGREE	10	26.3	IXXXXXXXXXX				
			IXXXXXXXXXX				
B. DISAGREE	12	31.6	IXXXXXXXXXXXX				
			IXXXXXXXXXXXX				
C. INCLINED TO DISAGREE	5	13.2	IXXXXXX				
			IXXXXXX				
D. UNDECIDED	0	0.0	I				
			I				
E. INCLINED TO AGREE	8	21.1	IXXXXXXXXX				
			IXXXXXXXXX				
F. AGREE	3	7.9	IXXXX				
			IXXXX				
G. STRONGLY AGREE	0	0.0	I				
			I				

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APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
THESIS GSM/SM/76S-21

18E. THE IDEA TO ESTABLISH A TECHNOLOGY TRANSFER AGENCY HAS ENOUGH MERIT TO WARRANT FURTHER CONSIDERATION.	RESPONSES NO.	%	DISTRIBUTION OF RESPONSES 0% 25% 50% 75% 100%
A. STRONGLY DISAGREE	9	23.7	IXXXXXXXXXX IXXXXXXXXXX
B. DISAGREE	6	15.8	IXXXXXXX IXXXXXXX
C. INCLINED TO DISAGREE	4	10.5	IXXXXX IXXXXX
D. UNDECIDED	1	2.6	IXX IXX
E. INCLINED TO AGREE	8	21.1	IXXXXXXXXX IXXXXXXXXX
F. AGREE	7	18.4	IXXXXXXXX IXXXXXXXX
G. STRONGLY AGREE	3	7.9	IXXXX IXXXX

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APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

1. ARE YOU PRESENTLY ASSIGNED TO A	LAB	PROD DIV	OTHER	ROW TOTAL
A. LABORATORY	17 100.0	0 0.0	0 0.0	17 44.7
B. PRODUCT DIVISION (STAFF ORGANIZATION)	0 0.0	3 17.6	0 0.0	3 7.9
C. PRODUCT DIVISION (PROGRAM OFFICE)	0 0.0	0 0.0	0 0.0	0 0.0
D. PRODUCT DIVISION (FUNCTIONAL ORGANIZATION)	0 0.0	14 82.4	0 0.0	14 36.8
E. OTHER	0 0.0	0 0.0	4 100.0	4 10.5
COLUMN TOTALS	17	17	4	38

2. WHAT IS YOUR GRADE?	LAB	PROD DIV	OTHER	ROW TOTAL
A. CAPTAIN	1 5.9	0 0.0	1 25.0	2 5.3
B. MAJOR	3 17.6	0 0.0	0 0.0	3 7.9
C. LIEUTENANT COLONEL	0 0.0	1 5.9	3 75.0	4 10.5
D. COLONEL	0 0.0	0 0.0	0 0.0	0 0.0
E. GS 12	0 0.0	0 0.0	0 0.0	0 0.0
F. GS 13	2 11.8	5 29.4	0 0.0	7 18.4
G. GS 14	6 35.3	4 23.5	0 0.0	10 26.3
H. GS 15	4 23.5	5 29.4	0 0.0	9 23.7
I. GS 16 AND ABOVE	1 5.9	2 11.8	0 0.0	3 7.9
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

3. HOW LONG HAVE YOU BEEN IN THE RESEARCH AND DEVELOPMENT FIELD?

	LAB	PROD DIV	OTHER	ROW TOTAL
A. LESS THAN 1 YR	1 5.9	0 0.0	0 0.0	1 2.6
B. 1 YR TO 4 YRS	2 11.8	0 0.0	0 0.0	2 5.3
C. 4 YRS TO 8 YRS	1 5.9	0 0.0	2 50.0	3 7.9
D. 8 YRS TO 12 YRS	2 11.8	1 5.9	1 25.0	4 10.5
E. 12 YRS TO 16 YRS	3 17.6	3 17.6	1 25.0	7 18.4
F. 16 YRS TO 20 YRS	0 0.0	2 11.8	0 0.0	2 5.3
G. MORE THAN 20 YRS	8 47.1	11 64.7	0 0.0	19 50.0
COLUMN TOTALS	17	17	4	38

4. HOW LONG HAVE YOU BEEN IN YOUR PRESENT WORK ASSIGNMENT?

	LAB	PROD DIV	OTHER	ROW TOTAL
A. LESS THAN 6 MOS	2 11.8	2 11.8	0 0.0	4 10.5
B. 6 MOS TO 2 YRS	7 41.2	2 11.8	1 25.0	10 26.3
C. 2 YRS TO 4 YRS	3 17.6	5 29.4	2 50.0	10 26.3
D. 4 YRS TO 6 YRS	1 5.9	0 0.0	1 25.0	2 5.3
E. 6 YRS TO 8 YRS	3 17.6	3 17.6	0 0.0	6 15.8
F. 8 YRS TO 10 YRS	1 5.9	1 5.9	0 0.0	2 5.3
G. MORE THAN 10 YRS	0 0.0	4 23.5	0 0.0	4 10.5
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX G
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

5. PRODUCT DIVISION ONLY - SELECT ONE STATEMENT SHOWING EXTENT YOU HAVE PARTICIPATED IN ADP ASSESSMENTS. I HAVE:	LAB	PROD DIV	OTHER	ROW TOTAL
A. BEEN A FOCAL POINT FOR GATHERING COMMENTS FOR ADP ASSESSMENTS.	0 0.0	11 64.7	0 0.0	11 61.1
B. PARTICIPATED IN THE ACTUAL WRITING OF AN ADP ASSESSMENT.	0 0.0	3 17.6	0 0.0	3 16.7
C. PROVIDED WRITTEN COMMENTS TO SUPPORT MORE THAN ONE ADP ASSESSMENT.	0 0.0	2 11.8	1 100.0	3 16.7
D. PROVIDED WRITTEN COMMENTS TO SUPPORT ONLY ONE ADP ASSESSMENT.	0 0.0	1 5.9	0 0.0	1 5.6
E. WRITTEN NOTHING, BUT PARTICIPATED IN OFFICE ASSESSMENT OF AN ADP.	0 0.0	0 0.0	0 0.0	0 0.0
F. NOT PARTICIPATED, BUT AM KNOWLEDGEABLE OF POLICY.	0 0.0	0 0.0	0 0.0	0 0.0
G. NOT PARTICIPATED, AND AM ONLY VAGUELY AWARE OF POLICY.	0 0.0	0 0.0	0 0.0	0 0.0
H. NOT HEARD OF ADP ASSESSMENT REQUIREMENT BEFORE TODAY.	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	0	17	1	18

6A. THE ADP ASSESSMENT POLICY WILL ENCOURAGE PLANNING ACTIVITIES WHICH MAY EXPOSE PROBLEMS.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	0 0.0	0 0.0	0 0.0
B. DISAGREE	1 5.9	0 0.0	0 0.0	1 2.6
C. INCLINED TO DISAGREE	4 23.5	1 5.9	1 25.0	6 15.8
D. UNDECIDED	0 0.0	2 11.8	0 0.0	2 5.3
E. INCLINED TO AGREE	7 41.2	4 23.5	0 0.0	11 28.9
F. AGREE	4 23.5	2 11.8	3 75.0	9 23.7
G. STRONGLY AGREE	1 5.9	8 47.1	0 0.0	9 23.7
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

59. THE ADP ASSESSMENT POLICY WILL ENCOURAGE A FORUM FOR PROBLEM RESOLUTION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	0 0.0	0 0.0	1 2.6
B. DISAGREE	2 11.8	1 5.9	0 0.0	3 7.9
C. INCLINED TO DISAGREE	2 11.8	1 5.9	2 50.0	5 13.2
D. UNDECIDED	2 11.8	0 0.0	0 0.0	2 5.3
E. INCLINED TO AGREE	7 41.2	6 35.3	1 25.0	14 36.8
F. AGREE	3 17.6	4 23.5	1 25.0	8 21.1
G. STRONGLY AGREE	0 0.0	5 29.4	0 0.0	5 13.2
COLUMN TOTALS	17	17	4	38

60. THE ADP ASSESSMENT POLICY WILL ENCOURAGE STRONG PRODUCT DIVISION SUPPORT.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
B. DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
C. INCLINED TO DISAGREE	3 17.6	2 11.8	1 25.0	6 15.8
D. UNDECIDED	1 5.9	0 0.0	1 25.0	2 5.3
E. INCLINED TO AGREE	3 17.6	2 11.8	1 25.0	6 15.8
F. AGREE	7 41.2	4 23.5	1 25.0	12 31.6
G. STRONGLY AGREE	3 17.6	7 41.2	0 0.0	10 26.3
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

60. THE ADP ASSESSMENT POLICY WILL ENCOURAGE ESTABLISHING THAT THE TECHNOLOGY IS MATURE.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
B. DISAGREE	2 11.8	0 0.0	0 0.0	2 5.3
C. INCLINED TO DISAGREE	4 23.5	2 11.8	0 0.0	6 15.8
D. UNDECIDED	1 5.9	0 0.0	0 0.0	1 2.6
E. INCLINED TO AGREE	4 23.5	4 23.5	3 75.0	11 28.9
F. AGREE	5 29.4	7 41.2	1 25.0	13 34.2
G. STRONGLY AGREE	1 5.9	3 17.6	0 0.0	4 10.5
COLUMN TOTALS	17	17	4	38

65. THE ADP ASSESSMENT POLICY WILL ENCOURAGE THE ESTABLISHMENT OF AN EARLY INFORMATIONAL LINK.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	0 0.0	0 0.0	0 0.0
B. DISAGREE	0 0.0	0 0.0	0 0.0	0 0.0
C. INCLINED TO DISAGREE	1 5.9	0 0.0	1 25.0	2 5.3
D. UNDECIDED	1 5.9	0 0.0	0 0.0	1 2.6
E. INCLINED TO AGREE	6 35.3	3 17.6	0 0.0	9 23.7
F. AGREE	5 29.4	4 23.5	2 50.0	11 28.9
G. STRONGLY AGREE	4 23.5	10 58.8	1 25.0	15 39.5
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

7A. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, INERTIA WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
B. DISAGREE	0 0.0	3 17.6	0 0.0	3 7.9
C. INCLINED TO DISAGREE	3 17.6	1 5.9	1 25.0	5 13.2
D. UNDECIDED	1 5.9	0 0.0	0 0.0	1 2.6
E. INCLINED TO AGREE	5 29.4	4 23.5	2 50.0	11 28.9
F. AGREE	3 17.6	3 17.6	0 0.0	6 15.8
G. STRONGLY AGREE	5 29.4	5 29.4	1 25.0	11 28.9
COLUMN TOTALS	17	17	4	38

7B. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, A LACK OF AN INCENTIVE STRUCTURE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	3 17.6	0 0.0	1 25.0	4 10.5
B. DISAGREE	5 29.4	2 11.8	0 0.0	7 18.4
C. INCLINED TO DISAGREE	1 5.9	2 11.8	1 25.0	4 10.5
D. UNDECIDED	0 0.0	2 11.8	1 25.0	3 7.9
E. INCLINED TO AGREE	7 41.2	1 5.9	0 0.0	8 21.1
F. AGREE	1 5.9	5 29.4	1 25.0	7 18.4
G. STRONGLY AGREE	0 0.0	5 29.4	0 0.0	5 13.2
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX C
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

7C. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, COST WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
B. DISAGREE	3 17.6	1 5.9	0 0.0	4 10.5
C. INCLINED TO DISAGREE	5 29.4	0 0.0	0 0.0	5 13.2
D. UNDECIDED	0 0.0	3 17.6	1 25.0	4 10.5
E. INCLINED TO AGREE	4 23.5	5 29.4	3 75.0	12 31.6
F. AGREE	4 23.5	5 29.4	0 0.0	9 23.7
G. STRONGLY AGREE	1 5.9	2 11.8	0 0.0	3 7.9
COLUMN TOTALS	17	17	4	38

7D. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, COMMUNICATION WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	0 0.0	0 0.0	1 2.6
B. DISAGREE	3 17.6	1 5.9	0 0.0	4 10.5
C. INCLINED TO DISAGREE	4 23.5	1 5.9	0 0.0	5 13.2
D. UNDECIDED	0 0.0	0 0.0	0 0.0	0 0.0
E. INCLINED TO AGREE	3 17.6	6 35.3	2 50.0	11 28.9
F. AGREE	4 23.5	5 29.4	2 50.0	11 28.9
G. STRONGLY AGREE	2 11.8	4 23.5	0 0.0	6 15.8
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

7E. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TIME WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	0 0.0	0 0.0	1 2.6
B. DISAGREE	2 11.8	0 0.0	0 0.0	2 5.3
C. INCLINED TO DISAGREE	4 23.5	2 11.8	2 50.0	8 21.1
D. UNDECIDED	0 0.0	0 0.0	0 0.0	0 0.0
E. INCLINED TO AGREE	5 29.4	3 17.6	0 0.0	8 21.1
F. AGREE	2 11.8	8 47.1	2 50.0	12 31.6
G. STRONGLY AGREE	3 17.6	4 23.5	0 0.0	7 18.4
COLUMN TOTALS	17	17	4	38

7F. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, GEOGRAPHIC DISTANCE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	4 23.5	3 17.6	0 0.0	7 18.4
B. DISAGREE	6 35.3	4 23.5	1 25.0	11 28.9
C. INCLINED TO DISAGREE	2 11.8	4 23.5	1 25.0	7 18.4
D. UNDECIDED	2 11.8	0 0.0	1 25.0	3 7.9
E. INCLINED TO AGREE	3 17.6	4 23.5	0 0.0	7 18.4
F. AGREE	0 0.0	2 11.8	0 0.0	2 5.3
G. STRONGLY AGREE	0 0.0	0 0.0	1 25.0	1 2.6
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

7G. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TRANSFER MANAGEMENT STRUCTURE WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	2 11.8	0 0.0	2 5.3
B. DISAGREE	2 11.8	1 5.9	0 0.0	3 7.9
C. INCLINED TO DISAGREE	3 17.6	1 5.9	1 25.0	5 13.2
D. UNDECIDED	1 5.9	1 5.9	1 25.0	3 7.9
E. INCLINED TO AGREE	2 11.8	4 23.5	2 50.0	8 21.1
F. AGREE	5 29.4	4 23.5	0 0.0	9 23.7
G. STRONGLY AGREE	4 23.5	4 23.5	0 0.0	8 21.1
COLUMN TOTALS	17	17	4	38

7H. BEFORE THE ADP ASSESSMENT POLICY WENT INTO EFFECT, TECHNOLOGY WAS A BARRIER TO THE TRANSFER OF ADP TECHNOLOGY TO SYSTEM APPLICATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	3 17.6	1 5.9	0 0.0	4 10.5
B. DISAGREE	6 35.3	3 17.6	0 0.0	9 23.7
C. INCLINED TO DISAGREE	5 29.4	3 17.6	0 0.0	8 21.1
D. UNDECIDED	0 0.0	0 0.0	1 25.0	1 2.6
E. INCLINED TO AGREE	2 11.8	4 23.5	2 50.0	8 21.1
F. AGREE	1 5.9	3 17.6	1 25.0	5 13.2
G. STRONGLY AGREE	0 0.0	3 17.6	0 0.0	3 7.9
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

9A. WITH THE ADP ASSESSMENT POLICY IN EFFECT, INERTIA WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.3	0 0.0	1 2.6
B. DISAGREE	0 0.0	3 17.6	1 25.0	4 10.5
C. INCLINED TO DISAGREE	4 23.5	4 23.5	2 50.0	10 26.3
D. UNDECIDED	1 5.9	0 0.0	0 0.0	1 2.6
E. INCLINED TO AGREE	7 41.2	4 23.5	1 25.0	12 31.6
F. AGREE	3 17.6	2 11.8	0 0.0	5 13.2
G. STRONGLY AGREE	2 11.8	3 17.6	0 0.0	5 13.2
COLUMN TOTALS	17	17	4	38

9B. WITH THE ADP ASSESSMENT POLICY IN EFFECT, LACK OF INCENTIVE STRUCTURE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	3 17.6	0 0.0	1 25.0	4 10.5
B. DISAGREE	4 23.5	3 17.6	0 0.0	7 18.4
C. INCLINED TO DISAGREE	4 23.5	3 17.6	2 50.0	9 23.7
D. UNDECIDED	3 17.6	2 11.8	1 25.0	6 15.8
E. INCLINED TO AGREE	3 17.6	3 17.6	0 0.0	6 15.8
F. AGREE	0 0.0	4 23.5	0 0.0	4 10.5
G. STRONGLY AGREE	0 0.0	2 11.8	0 0.0	2 5.3
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

86. WITH THE ADP ASSESSMENT POLICY IN EFFECT, COST WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
B. DISAGREE	5 29.4	1 5.9	0 0.0	6 15.8
C. INCLINED TO DISAGREE	5 29.4	3 17.6	2 50.0	10 26.3
D. UNDECIDED	1 5.9	3 17.6	0 0.0	4 10.5
E. INCLINED TO AGREE	5 29.4	2 11.8	2 50.0	9 23.7
F. AGREE	1 5.9	5 29.4	0 0.0	6 15.8
G. STRONGLY AGREE	0 0.0	2 11.8	0 0.0	2 5.3
COLUMN TOTALS	17	17	4	38

87. WITH THE ADP ASSESSMENT POLICY IN EFFECT, COMMUNICATION WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	2 11.8	0 0.0	0 0.0	2 5.3
B. DISAGREE	7 41.2	8 47.1	2 50.0	17 44.7
C. INCLINED TO DISAGREE	2 11.8	2 11.8	2 50.0	6 15.8
D. UNDECIDED	2 11.8	1 5.9	0 0.0	3 7.9
E. INCLINED TO AGREE	3 17.6	3 17.6	0 0.0	6 15.8
F. AGREE	1 5.9	1 5.9	0 0.0	2 5.3
G. STRONGLY AGREE	0 0.0	2 11.8	0 0.0	2 5.3
COLUMN TOTALS	17	17	4	38

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

9E. WITH THE ADP ASSESSMENT POLICY IN EFFECT, TIME WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	0 0.0	1 25.0	2 5.3
B. DISAGREE	2 11.8	1 5.9	1 25.0	4 10.5
C. INCLINED TO DISAGREE	4 23.5	5 29.4	1 25.0	10 26.3
D. UNDECIDED	2 11.8	0 0.0	1 25.0	3 7.9
E. INCLINED TO AGREE	3 17.6	3 17.6	0 0.0	6 15.8
F. AGREE	3 17.6	6 35.3	0 0.0	9 23.7
G. STRONGLY AGREE	2 11.8	2 11.8	0 0.0	4 10.5
COLUMN TOTALS	17	17	4	38

9F. WITH THE ADP ASSESSMENT POLICY IN EFFECT, GEOGRAPHIC DISTANCE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	4 23.5	3 17.6	0 0.0	7 18.4
B. DISAGREE	6 35.3	5 29.4	2 50.0	13 34.2
C. INCLINED TO DISAGREE	1 5.9	3 17.6	1 25.0	5 13.2
D. UNDECIDED	5 29.4	1 5.9	0 0.0	6 15.8
E. INCLINED TO AGREE	1 5.9	3 17.6	1 25.0	5 13.2
F. AGREE	0 0.0	2 11.8	0 0.0	2 5.3
G. STRONGLY AGREE	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	17	4	38

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APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

AG. WITH ADP ASSESSMENT POLICY IN EFFECT, TRANSFER MANAGEMENT STRUCTURE WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	2 11.8	0 0.0	3 7.9
B. DISAGREE	4 23.5	4 23.5	2 50.0	10 26.3
C. INCLINED TO DISAGREE	7 41.2	4 23.5	1 25.0	12 31.6
D. UNDECIDED	0 0.0	1 5.9	0 0.0	1 2.6
E. INCLINED TO AGREE	2 11.8	3 17.6	1 25.0	6 15.8
F. AGREE	3 17.6	3 17.6	0 0.0	6 15.8
G. STRONGLY AGREE	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	17	4	38

AH. WITH THE ADP ASSESSMENT POLICY IN EFFECT, TECHNOLOGY WILL OR WILL STILL REPRESENT A BARRIER TO ADP TECHNOLOGY TRANSFER.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	4 23.5	1 5.9	0 0.0	5 13.2
B. DISAGREE	6 35.3	6 35.3	0 0.0	12 31.6
C. INCLINED TO DISAGREE	5 29.4	6 35.3	2 50.0	13 34.2
D. UNDECIDED	0 0.0	0 0.0	1 25.0	1 2.6
E. INCLINED TO AGREE	2 11.8	2 11.8	1 25.0	5 13.2
F. AGREE	0 0.0	1 5.9	0 0.0	1 2.6
G. STRONGLY AGREE	0 0.0	1 5.9	0 0.0	1 2.6
COLUMN TOTALS	17	17	4	38

AI. I HAVE HEARD OF THE FOLLOWING NUMBER OF ADVANCED DEVELOPMENT PROGRAMS/ PROJECTS BECAUSE OF THE ADP ASSESSMENT POLICY/ACTIVITY.	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	8 72.7	4 23.5	0 0.0	12 38.7
B. 1	1	3	1	5

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C. 2	2	2	0	4
	18.2	11.8	0.0	12.9
D. 3	0	3	0	3
	0.0	17.6	0.0	9.7
E. 4	0	2	1	3
	0.0	11.8	33.3	9.7
F. MORE THAN 4	0	3	1	4
	0.0	17.6	33.3	12.9
COLUMN TOTALS	11	17	3	31

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APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

10A. ARE THERE OTHERS YOU NOW KNOW ABOUT, BUT PROBABLY WOULD NOT HAVE LEARNED OF IF ADP ASSESSMENT POLICY/ACTIVITY HAD NOT OCCURRED?	LAB	PROD DIV	OTHER	ROW TOTAL
A. YES	1 9.1	11 64.7	0 0.0	12 38.7
B. NO	10 90.9	6 35.3	3 100.0	19 61.3
COLUMN TOTALS	11	17	3	31

10B. IF MORE THAN ONE, ABOUT HOW MANY?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 2	10 90.9	6 35.3	3 100.0	19 61.3
B. 1	0 0.0	3 17.6	0 0.0	3 9.7
C. 2	0 0.0	3 17.6	0 0.0	3 9.7
D. 3	1 9.1	2 11.8	0 0.0	3 9.7
E. 4	0 0.0	0 0.0	0 0.0	0 0.0
F. MORE THAN 4	0 0.0	3 17.6	0 0.0	3 9.7
COLUMN TOTALS	11	17	3	31

11A. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH HIGHER HEADQUARTERS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	1 6.3	11 64.7	0 0.0	12 33.3
B. 1 TO 3	3 18.8	2 11.8	1 33.3	6 16.7
C. 4 TO 7	4 25.0	2 11.8	0 0.0	6 16.7
D. 8 TO 11	1 6.3	1 5.9	1 33.3	3 8.3
E. 12 TO 15	3 18.8	0 0.0	0 0.0	3 8.3
F. 16 TO 20	3 18.8	0 0.0	1 33.3	4 11.1
G. MORE THAN 20	1 6.3	1 5.9	0 0.0	2 5.6

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INTERVIEW RESULTS BY ORGANIZATION

11B. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH PRODUCT DIVISIONS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	2 12.5	8 47.1	1 33.3	11 30.6
B. 1 TO 3	6 37.5	5 29.4	0 0.0	11 30.6
C. 4 TO 7	5 31.3	2 11.8	1 33.3	8 22.2
D. 8 TO 11	1 6.3	0 0.0	1 33.3	2 5.6
E. 12 TO 15	1 6.3	0 0.0	0 0.0	1 2.8
F. 16 TO 20	1 6.3	0 0.0	0 0.0	1 2.8
G. MORE THAN 20	0 0.0	2 11.8	0 0.0	2 5.6
COLUMN TOTALS	16	17	3	36

11C. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH LABORATORIES?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	3 18.8	3 17.6	1 33.3	7 19.4
B. 1 TO 3	3 18.8	5 29.4	0 0.0	8 22.2
C. 4 TO 7	5 31.3	5 29.4	0 0.0	10 27.8
D. 8 TO 11	3 18.8	1 5.9	0 0.0	4 11.1
E. 12 TO 15	0 0.0	1 5.9	1 33.3	2 5.6
F. 16 TO 20	1 6.3	0 0.0	1 33.3	2 5.6
G. MORE THAN 20	1 6.3	2 11.8	0 0.0	3 8.3
COLUMN TOTALS	16	17	3	36

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APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

11D. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH AFLC?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	9 50.0	12 70.6	2 66.7	22 61.1
B. 1 TO 3	7 43.4	3 17.6	1 33.3	11 30.6
C. 4 TO 7	1 6.3	1 5.9	0 0.0	2 5.6
D. 8 TO 11	0 0.0	1 5.9	0 0.0	1 2.8
E. 12 TO 15	0 0.0	0 0.0	0 0.0	0 0.0
F. 16 TO 20	0 0.0	0 0.0	0 0.0	0 0.0
G. MORE THAN 20	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	16	17	3	36

11E. BEFORE ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME WAS SPENT COMMUNICATING ABOUT NEW ADPS WITH OPERATIONAL COMMANDS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	3 18.8	12 70.6	2 66.7	17 47.2
B. 1 TO 3	7 43.4	3 17.6	1 33.3	11 30.6
C. 4 TO 7	3 18.8	1 5.9	0 0.0	4 11.1
D. 8 TO 11	1 6.3	1 5.9	0 0.0	2 5.6
E. 12 TO 15	0 0.0	0 0.0	0 0.0	0 0.0
F. 16 TO 20	1 6.3	0 0.0	0 0.0	1 2.8
G. MORE THAN 20	1 6.3	0 0.0	0 0.0	1 2.8
COLUMN TOTALS	16	17	3	36

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12A. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH HIGHER HEADQUARTERS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	1 6.3	8 47.1	0 0.0	9 25.0
B. 1 TO 3	5 31.3	4 23.5	0 0.0	9 25.0
C. 4 TO 7	3 18.8	2 11.8	1 33.3	6 16.7
D. 8 TO 11	2 12.5	2 11.8	1 33.3	5 13.9
E. 12 TO 15	2 12.5	0 0.0	0 0.0	2 5.6
F. 16 TO 20	0 0.0	0 0.0	1 33.3	1 2.8
G. MORE THAN 20	3 18.8	1 5.9	0 0.0	4 11.1
COLUMN TOTALS	16	17	3	36

12B. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH PRODUCT DIVISIONS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	1 6.3	5 29.4	1 33.3	7 19.4
B. 1 TO 3	1 6.3	6 35.3	0 0.0	7 19.4
C. 4 TO 7	7 43.8	3 17.6	0 0.0	10 27.8
D. 8 TO 11	5 31.3	1 5.9	2 66.7	8 22.2
E. 12 TO 15	1 6.3	0 0.0	0 0.0	1 2.8
F. 16 TO 20	0 0.0	0 0.0	0 0.0	0 0.0
G. MORE THAN 20	1 6.3	2 11.8	0 0.0	3 8.3
COLUMN TOTALS	16	17	3	36

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INTERVIEW RESULTS BY ORGANIZATION

120. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH LABORATORIES?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	3 18.8	0 0.0	1 33.3	4 11.1
B. 1 TO 3	4 25.0	2 11.8	0 0.0	6 16.7
C. 4 TO 7	4 25.0	7 41.2	0 0.0	11 30.6
D. 8 TO 11	2 12.5	3 17.6	0 0.0	5 13.9
E. 12 TO 15	1 6.3	2 11.8	1 33.3	4 11.1
F. 16 TO 20	1 6.3	2 11.8	1 33.3	4 11.1
G. MORE THAN 20	1 6.3	1 5.9	0 0.0	2 5.6
COLUMN TOTALS	16	17	3	36

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120. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH SPLC?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	8 50.0	8 47.1	2 66.7	18 50.0
B. 1 TO 3	7 43.8	7 41.2	1 33.3	15 41.7
C. 4 TO 7	1 6.3	1 5.9	0 0.0	2 5.6
D. 8 TO 11	0 0.0	1 5.9	0 0.0	1 2.8
E. 12 TO 15	0 0.0	0 0.0	0 0.0	0 0.0
F. 16 TO 20	0 0.0	0 0.0	0 0.0	0 0.0
G. MORE THAN 20	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	16	17	3	36

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ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

12. WITH ADP POLICY, WHAT PERCENT OF YOUR WORKING TIME IS OR WILL BE SPENT COMMUNICATING ABOUT NEW ADPS WITH OPERATIONAL COMMANDS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	3 18.8	8 47.1	1 33.3	12 33.3
B. 1 TO 3	6 37.5	6 35.3	1 33.3	13 36.1
C. 4 TO 7	4 25.0	2 11.8	1 33.3	7 19.4
D. 8 TO 11	1 6.3	1 5.9	0 0.0	2 5.6
E. 12 TO 15	0 0.0	0 0.0	0 0.0	0 0.0
F. 16 TO 20	0 0.0	0 0.0	0 0.0	0 0.0
G. MORE THAN 20	2 12.5	0 0.0	0 0.0	2 5.6
COLUMN TOTALS	16	17	3	36

13. HOW MUCH OF YOUR WORKING TIME SHOULD BE SPENT COMMUNICATING WITH PERSONNEL IN THE LABORATORY (PRODUCT DIVISION)?	LAB	PROD DIV	OTHER	ROW TOTAL
A. 0	0 0.0	0 0.0	0 0.0	0 0.0
B. 1 TO 3	1 5.9	0 0.0	0 0.0	1 2.8
C. 4 TO 7	5 29.4	4 23.5	1 50.0	10 27.8
D. 8 TO 11	7 41.2	5 29.4	1 50.0	13 36.1
E. 12 TO 15	1 5.9	1 5.9	0 0.0	2 5.6
F. 16 TO 20	2 11.8	6 35.3	0 0.0	8 22.2
G. MORE THAN 20	1 5.9	1 5.9	0 0.0	2 5.6
COLUMN TOTALS	17	17	2	36

14. DO YOU THINK THAT THE ADP POLICY WILL IMPROVE THE DIALOGUE BETWEEN YOURSELF AND THE PRODUCT DIVISION OR LABORATORY?	LAB	PROD DIV	OTHER	ROW TOTAL
A. YES	11 64.7	17 100.0	3 100.0	31 83.8
B. NO	6	0	0	6

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COLUMN TOTALS	17	17	3	37

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INTERVIEW RESULTS BY ORGANIZATION

15A1. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON PAYOFF?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	1 5.9	0 0.0	0 0.0	1 5.9
B. VERY DIFFICULT	3 17.6	0 0.0	0 0.0	3 17.6
C. SOMEWHAT DIFFICULT	2 11.8	0 0.0	0 0.0	2 11.8
D. NEITHER DIFFICULT NOR EASY	1 5.9	0 0.0	0 0.0	1 5.9
E. SOMEWHAT EASY	5 29.4	0 0.0	0 0.0	5 29.4
F. EASY	2 11.8	0 0.0	0 0.0	2 11.8
G. VERY EASY	3 17.6	0 0.0	0 0.0	3 17.6
COLUMN TOTALS	17	0	0	17

15A2. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON SCHEDULES?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	0 0.0	0 0.0	0 0.0
B. VERY DIFFICULT	1 5.9	0 0.0	0 0.0	1 5.9
C. SOMEWHAT DIFFICULT	3 17.6	0 0.0	0 0.0	3 17.6
D. NEITHER DIFFICULT NOR EASY	3 17.6	0 0.0	0 0.0	3 17.6
E. SOMEWHAT EASY	8 47.1	0 0.0	0 0.0	8 47.1
F. EASY	2 11.8	0 0.0	0 0.0	2 11.8
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	0	0	17

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INTERVIEW RESULTS BY ORGANIZATION

1583. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON ADP COST ESTIMATES?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	0 0.0	0 0.0	0 0.0
B. VERY DIFFICULT	3 17.6	0 0.0	0 0.0	3 17.6
C. SOMEWHAT DIFFICULT	6 35.3	0 0.0	0 0.0	6 35.3
D. NEITHER DIFFICULT NOR EASY	3 17.6	0 0.0	0 0.0	3 17.6
E. SOMEWHAT EASY	4 23.5	0 0.0	0 0.0	4 23.5
F. EASY	1 5.9	0 0.0	0 0.0	1 5.9
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	0	0	17

1584. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON PRIORITY?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	4 23.5	0 0.0	0 0.0	4 23.5
B. VERY DIFFICULT	1 5.9	0 0.0	0 0.0	1 5.9
C. SOMEWHAT DIFFICULT	6 35.3	0 0.0	0 0.0	6 35.3
D. NEITHER DIFFICULT NOR EASY	3 17.6	0 0.0	0 0.0	3 17.6
E. SOMEWHAT EASY	3 17.6	0 0.0	0 0.0	3 17.6
F. EASY	0 0.0	0 0.0	0 0.0	0 0.0
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	0	0	17

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INTERVIEW RESULTS BY ORGANIZATION

154S. (LABORATORY) HOW DIFFICULT IS IT OR WOULD IT BE FOR YOU TO OBTAIN WHAT YOU FEEL IS RELIABLE INFORMATION ON ALTERNATE APPROACHES?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	0 0.0	0 0.0	0 0.0
B. VERY DIFFICULT	2 11.8	0 0.0	0 0.0	2 11.8
C. SOMEWHAT DIFFICULT	3 17.6	0 0.0	0 0.0	3 17.6
D. NEITHER DIFFICULT NOR EASY	6 35.3	0 0.0	0 0.0	6 35.3
E. SOMEWHAT EASY	5 29.4	0 0.0	0 0.0	5 29.4
F. EASY	1 5.9	0 0.0	0 0.0	1 5.9
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	0	0	17

158. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. YES	9 64.3	0 0.0	0 0.0	9 64.3
B. NO	5 35.7	0 0.0	0 0.0	5 35.7
COLUMN TOTALS	14	0	0	14

164I. (PRODUCT DIVISION) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM WHAT YOU FEEL IS A RELIABLE ADP ASSESSMENT WITH RESPECT TO PAYOFF?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	0 0.0	0 0.0	0 0.0
B. VERY DIFFICULT	0 0.0	4 23.5	0 0.0	4 19.0
C. SOMEWHAT DIFFICULT	0 0.0	3 17.6	1 25.0	4 19.0
D. NEITHER DIFFICULT NOR EASY	0 0.0	3 17.6	0 0.0	3 14.3
E. SOMEWHAT EASY	0 0.0	1 5.9	1 25.0	2 9.5
F. EASY	0 0.0	6 35.3	2 50.0	8 38.1
G. VERY EASY	0	0	0	0

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COLUMN TOTALS	0	17	4	21

APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

1642. (PRODUCT DIVISION) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO SCHEDULES?

	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	1 5.9	0 0.0	1 4.8
B. VERY DIFFICULT	0 0.0	1 5.9	1 25.0	2 9.5
C. SOMEWHAT DIFFICULT	0 0.0	7 41.2	1 25.0	8 38.1
D. NEITHER DIFFICULT NOR EASY	0 0.0	3 17.6	0 0.0	3 14.3
E. SOMEWHAT EASY	0 0.0	3 17.6	1 25.0	4 19.0
F. EASY	0 0.0	2 11.8	1 25.0	3 14.3
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	0	17	4	21

1643. (PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO ADP COST ESTIMATES?

	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	1 5.9	0 0.0	1 4.8
B. VERY DIFFICULT	0 0.0	6 35.3	1 25.0	7 33.3
C. SOMEWHAT DIFFICULT	0 0.0	3 17.6	2 50.0	5 23.8
D. NEITHER DIFFICULT NOR EASY	0 0.0	3 17.6	1 25.0	4 19.0
E. SOMEWHAT EASY	0 0.0	3 17.6	0 0.0	3 14.3
F. EASY	0 0.0	1 5.9	0 0.0	1 4.8
G. VERY EASY	0 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	0	17	4	21

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1644. (PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO PRIORITY?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	1 5.9	0 0.0	1 4.8
B. VERY DIFFICULT	0 0.0	3 17.6	1 25.0	4 19.0
C. SOMEWHAT DIFFICULT	0 0.0	3 17.6	1 25.0	4 19.0
D. NEITHER DIFFICULT NOR EASY	0 0.0	4 23.5	0 0.0	4 19.0
E. SOMEWHAT EASY	0 0.0	2 11.8	1 25.0	3 14.3
F. EASY	0 0.0	3 17.6	1 25.0	4 19.0
G. VERY EASY	0 0.0	1 5.9	0 0.0	1 4.8
COLUMN TOTALS	0	17	4	21

1645. (PRODUCT DIVISIONS) HOW DIFFICULT IS IT OR WOULD IT BE TO PERFORM A RELIABLE ADP ASSESSMENT WITH RESPECT TO DECISION OPTIONS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. VIRTUALLY IMPOSSIBLE	0 0.0	0 0.0	0 0.0	0 0.0
B. VERY DIFFICULT	0 0.0	1 5.9	0 0.0	1 4.8
C. SOMEWHAT DIFFICULT	0 0.0	4 23.5	2 50.0	6 28.6
D. NEITHER DIFFICULT NOR EASY	0 0.0	7 41.2	1 25.0	8 38.1
E. SOMEWHAT EASY	0 0.0	2 11.8	1 25.0	3 14.3
F. EASY	0 0.0	2 11.8	0 0.0	2 9.5
G. VERY EASY	0 0.0	1 5.9	0 0.0	1 4.8
COLUMN TOTALS	0	17	4	21

160. DO YOU THINK THAT THE PRODUCT DIVISIONS HAVE ENOUGH TIME AND MANPOWER TO DEVOTE TO THE ASSESSMENT PROCESS?	LAB	PROD DIV	OTHER	ROW TOTAL
A. YES	0 0.0	10 62.5	3 75.0	13 65.0
B. NO	0	6	1	7

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COLUMN TOTALS	0	16	4	20

APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

17A. PLEASE INDICATE YOUR THOUGHT ON THE DEGREE OF RESPONSIVENESS THAT SHOULD EXIST NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT.	LAB	PROD DIV	OTHER	ROW TOTAL
A. NONRESPONSIVE	0 0.0	0 0.0	0 0.0	0 0.0
B. NEITHER RESPONSIVE NOR NONRESPONSIVE	0 0.0	0 0.0	0 0.0	0 0.0
C. TO A SMALL EXTENT RESPONSIVE	0 0.0	0 0.0	0 0.0	0 0.0
D. SOMEWHAT RESPONSIVE	4 23.5	2 11.8	1 25.0	7 18.4
E. FOR THE MOST PART RESPONSIVE	8 47.1	5 29.4	0 0.0	13 34.2
F. VERY RESPONSIVE	5 29.4	5 29.4	3 75.0	13 34.2
G. EXCEEDINGLY RESPONSIVE	0 0.0	5 29.4	0 0.0	5 13.2
COLUMN TOTALS	17	17	4	38

17B. PLEASE INDICATE YOUR THOUGHT ON THE DEGREE OF RESPONSIVENESS THAT WILL EXIST NOW THAT THE ADP ASSESSMENT POLICY IS IN EFFECT.	LAB	PROD DIV	OTHER	ROW TOTAL
A. NONRESPONSIVE	0 0.0	1 5.9	0 0.0	1 2.6
B. NEITHER RESPONSIVE NOR NONRESPONSIVE	2 11.8	2 11.8	0 0.0	4 10.5
C. TO A SMALL EXTENT RESPONSIVE	0 0.0	4 23.5	0 0.0	4 10.5
D. SOMEWHAT RESPONSIVE	4 23.5	5 29.4	2 50.0	11 28.9
E. FOR THE MOST PART RESPONSIVE	8 47.1	4 23.5	1 25.0	13 34.2
F. VERY RESPONSIVE	3 17.6	0 0.0	1 25.0	4 10.5
G. EXCEEDINGLY RESPONSIVE	0 0.0	1 5.9	0 0.0	1 2.6
COLUMN TOTALS	17	17	4	38

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APPENDIX D

ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS

INTERVIEW RESULTS BY ORGANIZATION

18. THE ADP ASSESSMENT POLICY IS A GOOD IDEA.

	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	1 5.9	0 0.0	0 0.0	1 2.6
B. DISAGREE	0 0.0	1 5.9	0 0.0	1 2.6
C. INCLINED TO DISAGREE	0 0.0	0 0.0	0 0.0	0 0.0
D. UNDECIDED	1 5.9	1 5.9	0 0.0	2 5.3
E. INCLINED TO AGREE	5 29.4	2 11.8	0 0.0	7 18.4
F. AGREE	9 52.9	5 29.4	2 50.0	16 42.1
G. STRONGLY AGREE	1 5.9	8 47.1	2 50.0	11 28.9
COLUMN TOTALS	17	17	4	38

19A. THE IDEA OF PRODUCT DIVISIONS RATING LABS HAS ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.

	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	2 11.8	0 0.0	0 0.0	2 5.3
B. DISAGREE	4 23.5	3 17.6	2 50.0	9 23.7
C. INCLINED TO DISAGREE	1 5.9	2 11.8	1 25.0	4 10.5
D. UNDECIDED	1 5.9	1 5.9	0 0.0	2 5.3
E. INCLINED TO AGREE	5 29.4	2 11.8	1 25.0	8 21.1
F. AGREE	3 17.6	7 41.2	0 0.0	10 26.3
G. STRONGLY AGREE	1 5.9	2 11.8	0 0.0	3 7.9
COLUMN TOTALS	17	17	4	38

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APPENDIX D
ASSESSMENT OF ADVANCED DEVELOPMENT PROGRAM INTERVIEW RESULTS
INTERVIEW RESULTS BY ORGANIZATION

19B. THE IDEA OF LABS RATING PRODUCT DIVISIONS HAS ENOUGH MERIT TO WARRANT FURTHER CONSIDERATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	2	0	0	2
	11.8	0.0	0.0	5.3
B. DISAGREE	5	4	2	11
	29.4	23.5	50.0	28.9
C. INCLINED TO DISAGREE	1	2	1	4
	5.9	11.8	25.0	10.5
D. UNDECIDED	1	0	0	1
	5.9	0.0	0.0	2.6
E. INCLINED TO AGREE	6	5	1	12
	35.3	29.4	25.0	31.6
F. AGREE	2	4	0	6
	11.8	23.5	0.0	15.8
G. STRONGLY AGREE	0	2	0	2
	0.0	11.8	0.0	5.3
COLUMN TOTALS	17	17	4	38

19C. THE IDEA OF BOTH THE LABS AND PRODUCT DIVISIONS RATING EACH OTHER HAS ENOUGH MERIT TO WARRANT FURTHER CONSIDERATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	2	1	0	3
	11.8	5.9	0.0	7.9
B. DISAGREE	4	2	2	8
	23.5	11.8	50.0	21.1
C. INCLINED TO DISAGREE	2	2	1	5
	11.8	11.8	25.0	13.2
D. UNDECIDED	0	2	0	2
	0.0	11.8	0.0	5.3
E. INCLINED TO AGREE	6	4	1	11
	35.3	23.5	25.0	28.9
F. AGREE	3	4	0	7
	17.6	23.5	0.0	18.4
G. STRONGLY AGREE	0	2	0	2
	0.0	11.8	0.0	5.3
COLUMN TOTALS	17	17	4	38

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19D. THE IDEA TO MAKE FUTURE FUNDING CONTINGENT ON PAST TRANSFERS HAS ENOUGH MERIT TO WARRANT FURTHER CONSIDERATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	9 52.9	1 5.9	0 0.0	10 26.3
B. DISAGREE	2 11.8	6 35.3	4 100.0	12 31.6
C. INCLINED TO DISAGREE	0 0.0	5 29.4	0 0.0	5 13.2
D. UNDECIDED	0 0.0	0 0.0	0 0.0	0 0.0
E. INCLINED TO AGREE	5 29.4	3 17.6	0 0.0	8 21.1
F. AGREE	1 5.9	2 11.8	0 0.0	3 7.9
G. STRONGLY AGREE	1 0.0	0 0.0	0 0.0	0 0.0
COLUMN TOTALS	17	17	4	38

19E. THE IDEA TO ESTABLISH A TECHNOLOGY TRANSFER AGENCY HAS ENOUGH MERIT TO WARRENT FURTHER CONSIDERATION.	LAB	PROD DIV	OTHER	ROW TOTAL
A. STRONGLY DISAGREE	5 29.4	4 23.5	0 0.0	9 23.7
B. DISAGREE	0 0.0	5 29.4	1 25.0	6 15.8
C. INCLINED TO DISAGREE	3 17.6	1 5.9	0 0.0	4 10.5
D. UNDECIDED	0 0.0	1 5.9	0 0.0	1 2.6
E. INCLINED TO AGREE	6 35.3	0 0.0	2 50.0	8 21.1
F. AGREE	2 11.8	4 23.5	1 25.0	7 18.4
G. STRONGLY AGREE	1 5.9	2 11.8	0 0.0	3 7.9
COLUMN TOTALS	17	17	4	38

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APPENDIX E

Subjective Comments Collected During Interviews

Introduction

The subjective comments received during the conduct of the interviews are presented in this appendix. The comments have been segregated according to the individual's organizational grouping--laboratory, product division, and other. Also, the comments are listed according to the interview question which provided the stimulus for the comment. Both verbal and written comments were received during the conduct of the interviews. Also, some individuals offered several comments regarding one question.

An attempt has been made to indicate this to the reader by placing the comments presented in this appendix in a standard conversation format. If a verbal comment was made, then the wording shown has been paraphrased by the researcher, and the comment is not enclosed in quotation marks. If the comment was written on the interview schedule by the person interviewed, then it is transcribed exactly as written and is enclosed in quotation marks. Each comment received has been given a paragraph indentation. However, if these comments were received from the same individual then a single typewriter space separates the comments. Conversely, if the comments were received from different personnel, then a double typewriter space separates the comments.

QUESTION 6

LABORATORY PERSONNEL COMMENTS

In order to determine that a technology is mature, you have to spend time looking at it. I don't think that the product divisions have enough time to do this.

Management people don't pay attention to the TNs and coupling meetings. It is left up to the working level, and the discussions quickly focus on more mundane items, like what equation will you use or something like that.

One of the major results of this procedure will be a formal acknowledgement of product division need. Corporate memory will be documented.

The establishment that a technology is mature sometimes becomes a subjective decision. The labs say a technology is mature, and the receivers say it is not.

One thing you should be aware of is that there has been an unofficial assessment in effect. When we are comtemplating a new ADP, we generally try to go out and talk to people--get their ideas and comments.

How well these things are accomplished depends on how severely they get involved. They don't have the time and the people. I'm not negative toward the assessment concept, but it could be improved. I hope they are not going to use the assessment results as gospel the first time around. We weren't really ready to support the assessment process. We had a very limited amount of information available for the product divisions to assess.

Right now we tend to work all the problems too early. "The present policy is strong with respect to early identification of the mental set or customer bias which must be overcome before transition can occur--it is of negative value in identification and working of the central technology questions (scientific and technical) associated with the new area in that the customer tends to overemphasize mass production/ownership considerations."

QUESTION 6

PRODUCT DIVISION PERSONNEL COMMENTS

You have to recognize that there is not a single spokesman for the product division. The system acquisition people want zero risk and low cost. The system engineering people are concerned with today's problems, and they don't necessarily want new technology to solve them. The development planning people are more visionary and are not as tied to today's problems. So you stand a good chance of getting more than one assessment of an ADP.

I don't think you can stress the need for an early informational linkage enough. Changes in technology tend to jump in spurts, thus the assessment will help keep the engineering people abreast of these changes. Product division support depends on how the ADP emerges--whether it addresses a broad or specific need.

The labs are not necessarily the innovators. A lot of ideas are generated in the product divisions through TNs and through informal discussions with lab people. The development planning people in the product divisions sometimes push the labs into technology projects.

Establishing that technology is mature is the guts of the assessment. It gives you the indication of the output, when and how and what they can do--if it is done right that is. It will make planners write plans. Writing requires a lot more effort than just thinking about it.

The weakest part is that you are considering each ADP by itself. You need to look at the situation on an interlab basis. Otherwise you get the three blind men and the elephant effect.

The general attitude in this product division is that the labs are about 5 years behind us.

The problems that have to be resolved are not necessarily between the product divisions and the labs. One of our biggest problems is getting disagreements resolved in-house.

Chronologically ADPs should come after TNs. We can use the ADTP assessment to see if the labs are being responsive to TNs.

QUESTION 7

LABORATORY PERSONNEL COMMENTS

You should add another barrier--too much competition and proliferation of responsibility/development/acquisition of electronic subsystems.

I disagree that we have a lack of incentive to wean the technology. The lack of incentive is for the product division to try to use it.

Technology barriers are not a problem. Something good will always come out of an ADP, or else you won't be able to sell it. You'll never get it through the coordination cycle.

A transfer management structure is hard to define. We've been working almost two years on a MOA, and we finally got down to the nitpicking level and never did get it finished.

QUESTION 7

PRODUCT DIVISION PERSONNEL COMMENTS

The big problem in answering these questions is that there hasn't been enough time and enough assessments accomplished to determine what the effect will be.

I don't think it is inertia as much as it is a conflict in requirements. For example, the labs keep trying to build an inertial guidance set with better accuracy while the real system need is one with high reliability, low cost, and medium accuracy. The labs need to get more involved with the everyday mundane things rather than the high technology interesting ones.

The technology barriers have never been a problem.

In order to get an ADP approved, you have to go and "rego" through the approval cycle, and you need a favorable political situation.

The management structure has nothing to do with it. The product is either so good that it sells itself, or somebody within the product division has to accept the risk and specify it in.

The SPO director is the big factor [with respect to using an ADTP generated technology]. It depends on how he sees the risk involved, the cost, and schedule impact.

The labs come out with reports that nobody can use. The problem is that the labs can't get money unless they identify what weapon system they are trying to apply their program to. They have to sell it by attaching it to the current buzz word. As a result they don't get started in areas that are the primary need. By the time the lab is aware of what the problem is, the SPO and the prime contractor are off doing the work.

There is usually no grave doubt whether an ADP will work or not.

I think that the people that I work with are very communicative. This includes everyone from Lieutenants to Generals. They make it a point to advertise.

I think people are more likely to be the element of transfer than documents.

You are making the assumption that technology transfer is inherently good. It could be good not to transfer a bad technology.

The time barrier is important. The technology window is pretty narrow sometimes. We think the labs are consistently lobbing their shells behind it.

The real flow [of technology] is through a contractor. Contractors judge whether or not a new technology should be proposed. I don't know how you could have a structure dictate to a contractor what technology to use.

Major transfers do not occur between the lab and the product division directly. The product division will incorporate a new technology based on what it learns during source selection from contractors. The labs do not necessarily have all the solutions; in fact, the contractors will stress a solution which may have a little less performance and risk but is a lot cheaper.

QUESTION 7

OTHER PERSONNEL COMMENTS

"Too often technologist is pursuing technology for technology's sake and does not 'advertise' the good work he is doing."

"Systems too often take across-the-board cuts in all technology programs without sufficient regard for impact on individuals task's opportunity windows."

QUESTION 8

LABORATORY PERSONNEL COMMENTS

"The assessment procedure does not help product transition."

Not invented--here is a real problem. No matter what shape the ADP is in, it must be reengineered before it goes into a system.

QUESTION 8

PRODUCT DIVISION PERSONNEL COMMENTS

To get good cooperation between the product division and the labs--it is highly dependent on the quality of people involved and not on the management structure. You can go through the numbers and add all the management structure you want to, but in the end it is the people who make the thing work.

It will let us police the idea of design criteria and assessments. It will establish what it will take to transition--what it will take to sell it--the level of hardware development, etc.

[The respondent marked the "disagree" for all barriers and then added the following comment:] "Evidence to date suggests that the above viewpoints are very optimistic." I sent a rough draft of my assessment to the laboratory and asked for their comments, and they didn't respond.

More time (about two years) is required to determine if the new assessment procedure is a success. Ultimately the assessments will determine if the labs are doing a more creditable job of establishing a data base. This has been lacking in the past.

You need to do more than just ouput hardware. The labs should come up with data for design handbook and spec changes. We have to answer the question what do we do to apply it to a system. Generally, a specific system will have a specific constraint rather than a generic constraint. You might use the same technology in weapon system A and weapon system B, but more likely the black boxes will be different.

QUESTION 8

OTHER PERSONNEL COMMENTS

There is a lot more to transferring technology than overcoming barriers between the laboratories and the product divisions. There are many external factors driving a program manager. He is worried about costs, schedule, and performance, and sometimes he has to bite the bullet. He also has to be careful because if he says that the ADP should be used in his system the labs will try to bill him for it. Or someone will think that the program is in trouble and try to cancel it.

QUESTION 9

PRODUCT DIVISION PERSONNEL COMMENTS

This list of programs is a little unfair. Many of the programs were on-going before the assessment policy went into effect.

QUESTION 14

LABORATORY PERSONNEL COMMENTS

"Yes, if knowledgeable working level engineers' assessments of ADP programs are utilized rather [than] assessm nts made by a limited number of staff personnel."

"Our communications with the product division is [sic] very good now. The new policy may work if the product division players are not changed. If so, the communications channels will remain the same [as they are now]."

"I haven't found the development planners particularly informative on what the real needs are in the product divisions."

Assessment policy will improve the dialogue provided the product divisions do not become unreasonably adament in their stand.

It will raise the level of dialogue. In the past the other side said I don't want it. Now they can't just say I don't want it; they have to tell why.

"The policy has forced product divisions to review potential sources for emerging technologies within the lab. The next time they perceive a technology void, before they go directly to industry for solutions, they may remember a source uncovered during an assessment review."

"Good to get all levels of players to agree on criteria for judging programs."

"I indicated yes only because the program may be seen by more people, but not more agencies."

"There should be extensive dialogue with the product division, but I disagree with the current assessment policy."

It [the assessment process] has served to make everyone defensive.

QUESTION 14

PRODUCT DIVISION PERSONNEL COMMENTS

I think assessment adds a horizontal communication link. There has always been a good funding link between the labs and AFSC (DL), but now the assessment adds the link to AFSC (XR). It is weak, but it is there.

It did get more people involved with reviewing the ADP.

"[It] creates a formal organizational awareness, and that fosters dialogue."

The assessment policy will force lab people to talk more openly. It will force them to make estimates for the future. I think it will increase communications within the product division also.

It increases the arguments. Some lab people hate our guts right now.

I think it depends on the situation. One guy might do the whole assessment.

One thing you have to recognize is how these jobs are handled once they come in. The boss looks around and finds someone who is knowledgeable in that technical area and who isn't too busy to do the job. The next time the program gets assessed the guy who did it the first time is probably busy on something else or has been transferred out, and someone else is assigned. This new guy does his assessment without necessarily having the knowledge of what the first guy said, and his opinion might be different.

You have to consider how assessments are likely to be made. A person who isn't busy will get the job and will learn about the program. Most likely the results will not be gotten across to the engineers. If you were to get the word to everyone who needed it, the labs would spend all of their time educating people. It is really up to the individual engineer to keep track of things that happen in his own area of interest. I think it is the informal system that gets things accomplished.

QUESTION 15

LABORATORY PERSONNEL COMMENTS

"The technical program schedule options [are] easy, but schedules of probable applications appear to change continuously."

"Payoff is program related--as is ease of estimating a schedule that can be met within dollars provided."

The question is not whether the product divisions have enough time and manpower to devote to the assessment process. Rather it is will they treat it as important with respect to the other things they have to do.

I don't know how the product division intends to implement the policy.

The assessment policy is a waste of manpower.

QUESTION 16

PRODUCT DIVISION PERSONNEL COMMENTS

There are two kinds of costs we can assess. Life cycle cost is virtually impossible. The cost of ADP itself is somewhat difficult.

Cost estimates are really a problem to assess. I went to our cost people when making an assessment, and they wouldn't touch it.

What's the measurement of payoff? What's the bottom line? Many times payoffs are negated by problems that arise during the program.

We could have spent more time on payoff. To really assess payoff you have to do a detailed systems analysis and try to determine how the system performs with existing technology and how it would perform with the new technology. How do you really measure the effect of a new technology on combat effectiveness?

"Yes, if management supplies proper priority."

You can never get a handle on the assessment in the way they would like for you to do it. You just have to do the best you can.

I think that the assessment process is valuable. We should do it in preference to some of the "mickey mouse" exercises we have to do now. We do have deadlines, and we really can't do as good a job as you ought to be allowed.

"The answer to 16a is contingent on having sufficient time and manpower available. I do not think we now have either."

"Although the product divisions are manpower short, every effort should be given to assessing both old and new start ADPs on a semi-annual basis. These assessments could be done in conjunction with and by those people engaged in system studies that relate to this ADP."

"Reconciliation of opposing points of view within a product division takes the most time and effort. The tasks themselves may be difficult, but these are easily resolved when compared to the reconciliation of a product division assessment."

Time has to be made available. We can't afford not to take the time to do the assessments properly. I think we had problems the first time through but the process will become easier with time.

QUESTION 16

OTHER PERSONNEL COMMENTS

The product divisions should make the time available for the assessment process. It's an important aspect of their general responsibility.

QUESTION 17

LABORATORY PERSONNEL COMMENTS

An assessment means an evaluation of something that someone has done. The problem is how do you define what is to be done. We feel like we are going out and culling the world for problems. What are the product divisions doing to identify problems that advanced development programs can be built around? The product division has to identify what to be responsive to. It's hard to be responsive to a vacuum.

You get results from ADTPs as much as ten years in the future. The product division has to look ahead to when these values are recognized and not look to today's problems.

QUESTION 17

PRODUCT DIVISION PERSONNEL COMMENTS

The real way to make the laboratories responsive is to latch on to the right person at the laboratory. If he is interested in what you are trying to do, the program will sell.

You should have had a "before." Before, they were completely nonresponsive.

Essentially no change in lab response.

"A. The labs are not responsive to product division needs.
B. This deficiency is due, in part, to the sterile approach taken by the labs to develop their new programs. They do not seek nor apparently want product division inputs to shape their efforts.
C. The basis for any technology transfer is the existence of an adequate technology base. By a technology base is meant a body of knowledge, data point values, curves, etc. that depicts how the variables affecting a problem are interrelated (e.g., the old NACA reports of lift coefficients, etc.)."

QUESTION 18

LABORATORY PERSONNEL COMMENTS

The process will be all right after it is going for some time. It was a real problem in bringing the technical people in the product division up to speed on what we were doing. The process is also going to help in getting the engineering people to talk to the development planning people in the product divisions.

"In principle the product division assessment of advanced development programs is good, but a waiting, end-using system can never be identified for all advanced development programs. Only after demonstration of attainable capabilities combined with cost estimates will it be possible to sort out acceptable using weapon systems."

One of the best things I know of about the assessment policy is that it forces specific comments from the product divisions. They no longer can say that they just don't like it.

"The idea is good--the implementation is questionable."

"The ADTP assessment policy is a good idea, but the implementation is critical (i.e., timeliness of inputs, etc.)"

A key thing in making the assessment policy work is the granularity of the product division assessment. The program element level is generally a sufficient level for the assessment. They should not nitpick our programs or attempt to be project engineers. Another important thing is that a product division policy must be known early in the game. There has never been a corporate spokesman for the product division. Perhaps the assessment process will generate one.

"I agree that the assessment policy is good insofar as it increases the likelihood of an ADP finding a home and application in the product divisions. I see a danger that overemphasis on pleasing a product division in the short term, which is where their interest always is, may cause the long term technology to suffer."

It would be a good idea if it was worked correctly. I think it is a rather biased situation right now.

You have to be open-minded. You have to be able to talk about potential applications and merit. Recommendations have to be made on potential applications and merit. If the product divisions are asked to give a yes or no answer, you will get a lot of noes.

You don't sell a program by writing a plan. First you sell it, then you write the plan. I think the lab should work closely with the product divisions in the planning of an ADTP, and I think the product division should h ve a vote regarding an ADTP, but I don't think they should have a veto. The assessment policy gives them a veto. The assessments have been too short term; I think the process will be eliminated. Air Staff disagrees with XR having that much power. They have already turned around one assessment.

I think it is just a way to make money decisions for people at AFSC. They are getting somebody to do their job for them.

The likely outcome is that the assessment policy will do nothing.

QUESTION 18

PRODUCT DIVISION PERSONNEL COMMENTS

The ADTPs were almost autonomous within the labs. The seed was planted there, and the benefits were accrued and received there.

I think that the assessment is a good policy as implemented. There are a few snags, a few things to learn, and some personality and political problems to work out, but the labs are forced to take some hard looks at what they are doing. Previously we went to program review briefings, and we made comments on the programs that were briefed. The feeling here was that these efforts had no real impact on what the labs were doing and that it was a waste of time.

We have super internal coordination problems. I rewrote my assessment at least six times. Both groups have to take responsibility. The product divisions have the authority to kill a program now. What happens if a good program is cancelled because of a negative product division assessment.

ADTP assessments are a good idea, if it doesn't get down to just being a rubber stamp. It is up to the management to make it work.

"The ADP managers appear to want to minimize the influence of outside (product divisions) sources once the ADP has started. They don't return phone calls. No one likes to be exposed and re-exposed to criticism."

I don't understand how the assessments are used once they are sent to AFSC. I am not sure I have detected how it is going to be different.

One thing that bothers me about the assessment process is that you need a balence between technology for technology's sake and technology for systems. I fear there will be a tendency to overemphasize technology for systems.

QUESTION 19

LABORATORY PERSONNEL COMMENTS

"The amount of technology transferred involves more than just specific advanced development programs. Much technology is transferred through increasing industry technical capability--which frequently is factored into already approved or even ongoing production programs. In addition, 6.4 budget ceilings frequently limit the number of ADPs transferred to engineering development."

"With regard to establishing a technology transfer agency I must emphasize professional type technology transfer individuals; otherwise it would be a detriment."

"Regarding 5 above, no new bureacracy, but exploration of an agency such as product division plans."

QUESTION 19

PRODUCT DIVISION PERSONNEL COMMENTS

"[The] problem with these ideas is that they 'force' the transfer of technology; however, it is important to identify technology that shouldn't be transferred!" A valid output of an ADTP is that this technology is no good.

The first three items would do nothing but lead to a hugh "pissing contest." Number 5 works best informally. The product division engineer needs to get involved with a program which is of interest to him and work with the lab people on a daily basis if necessary.

You would have to somehow hold people accountable for the ratings. They can't just be open loop.

Number 4 sounds pretty bad to me. It doesn't allow the labs to turn around. The product divisions should have a voice in how the funds are spent, but should not control the funds.

The idea of making future funding contingent on past transfers is good only if it is a basis for reward. The labs shouldn't be punished for not transferring a technology because there are many things that affect whether or not a system will use the results of a particular advanced development program.

I hate to call it a transfer agency. The job should be done by the development planning people; except that right now I think we are dominated by the rest of the product division.

The labs should rate the content of what they put out instead of concentrating on just distributing the stuff. You don't need another level of bureacracy. If the job is done properly, the technology will sell itself.

A technology transfer agency sounds good in theory, but a typical Air Force reaction to a problem is to start an agency with experts and let them come up with answers. I haven't seen it work very well in practice.

The basic concept of a technology transfer agency is a beautiful theory, but it wouldn't work in practice. I think it would be another drain on manpower and would accomplish nothing. The technology transfer theory is that somebody looks at the future and decides what programs the labs should pursue. The labs do their thing and put the results on the shelf. Then the requirement comes along and uses it. In practice though it doesn't work like this. The future is not what we think it's going to be, and by the time we see what we would like to do we rush it through with the SPOs prime contractor doing the job. This normally bypasses the lab because it takes them so long to get a program started.

A transfer agency bothers me. I think we have enough bureaucracy already.

APPENDIX F

Results of Coefficient of Concordance Tests

Explanation of Tables

The tables in this appendix appresent the values computed for the key parameters of the coefficient of concordance test. The responses to Questions 6, 7, 8, 11, 12, 15a, 16a, and 19 were analyzed in this manner. The entries in the first two table columns are a description of the parameters contained in the various table row. Each of the remaining table columns represent values of this parameter computed for the responses given by personnel in the demographic grouping described by the table column heading.

The first five (eight for Questions 7 and 8) rows list the means of the ranks and the means of the response computed for each of the factors ranked. The values have been rounded. The remaining rows list the value of several parameters computed in performing the test. Note that the sum of the ranks assigned to a particular factor (R_j) can be computed by multiplying the mean rank times the number of respondents, denoted as n in the tables.

The following computational forms were used:

Friedman Test Statistic (T)

$$T = \frac{(k-1)S}{S_t'}$$

$$S = \sum_{j=1}^{k} \left[R_j - \frac{n(k+1)}{2} \right]^2$$

$$S_t' = \frac{nk(k^2-1) - \sum\sum t(t^2-1)}{12}$$

k number of factors ranked.

R_j sum of ranks assigned to the $j^{\underline{th}}$ factor.

n number of personnel interviewed within any given demographis grouping.

t number of tied ranks assigned by a person interviewed per group of tied ranks.

(Gibbons, 1971:233, 247, 249, 257)

Kendall's Coefficient of Concordance (W)

$$W = \frac{S}{\frac{1}{12} n^2 (k^3 - k) - n \sum T_t}$$

(Gibbons, 1971:257)

Degrees of Freedom ($\nu_1;\nu_2$)

$$\nu_1 = k - 1 - 2/n$$

$$\nu_2 = (n-1)\nu_1$$

(Gibbons, 1971:255)

Note: The values tabulated have been rounded.

F Statistic (F)

$$F = \frac{(n-1)W}{(1-W)}$$

(Gibbons, 1971:255)

Level of Significance ($\hat{\alpha}$)

ν_1 even:

$$\hat{\alpha} = x^{\frac{\nu_2}{2}} \left[1 + \frac{\nu_2}{2}(1-x) + \cdots + \frac{\nu_2(\nu_2+2)\cdots(\nu_2+\nu_1-4)}{2 \cdot 4 \cdots (\nu_1-2)} (1-x)^{\frac{\nu_1-2}{2}} \right]$$

ν_2 even:

$$\hat{\alpha} = 1 - (1-x)^{\frac{\nu_1}{2}} \left[1 + \frac{\nu_1}{2} + \cdots + \frac{\nu_1(\nu_1+2)\cdots(\nu_2+\nu_1-4)}{2 \cdot 4 \cdots (\nu_2-2)} x^{\frac{\nu_2-2}{2}} \right]$$

$$x = \frac{\nu_2}{\nu_2 + \nu_1 F}$$

(Hewlett Packard Company, 1975:52, 53)

TABLE F-I

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 6)

QUESTION 6: Please indicate the extent that you agree or disagree that the ADTP assessment policy will encourage the occurrence of such events.

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Planning Activities Which May Expose Problems	Mean Rank	3.01	2.88	3.00	3.08	3.00	3.13	2.89
	Mean Response	5.26	4.71	5.82	4.17	5.33	6.13	5.56
Provide Forum For Problem Resolution	Mean Rank	2.45	2.24	2.68	2.75	1.72	3.31	2.11
	Mean Response	4.82	4.24	5.53	4.00	4.44	6.13	5.00
Strong Product Division Support	Mean Rank	3.04	3.44	2.82	2.58	3.83	2.63	3.00
	Mean Response	5.29	5.35	5.41	4.00	6.00	5.38	5.44
Establish Technology Is Mature	Mean Rank	2.66	2.68	2.56	2.50	2.72	2.19	2.89
	Mean Response	4.95	4.53	5.29	3.83	5.11	5.75	4.89
Establish Early Informational Linkage	Mean Rank	3.84	3.77	3.94	4.08	3.72	3.75	4.11
	Mean Response	5.95	5.59	6.41	5.00	5.89	6.50	6.33
n		38	17	17	6	9	8	9
Friedman Test Statistic		21.8	13.0	10.6	5.16	13.5	6.25	9.16
Kendall's Coefficient of Concordance (W)		.144	.192	.155	.215	.376	.195	.254
Degrees of Freedom ($\nu_1;\nu_2$)		4;146	4;62	4;62	4;18	4;30	4;26	4;30
F Statistic		6.20	3.79	2.95	1.37	4.82	1.70	2.73
Level of Significance ($\hat{\alpha}$) ($1.2^{-4} = 1.2 \times 10^{-4}$, etc.)		1.2^{-4}	8.1^{-3}	2.7^{-2}	2.8^{-1}	4.0^{-3}	1.8^{-1}	4.8^{-2}

TABLE F-I (CONTINUED)

QUESTION 6: Please indicate the extent that you agree or disagree that the ADTP assessment policy will encourage the occurrence of such events.

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Planning Activities Which May Expose Problems	Mean Rank	2.42	3.26	3.16	2.67	3.36	2.27
	Mean Response	5.00	5.43	5.42	5.07	5.52	4.85
Provide Forum For Problem Resolution	Mean Rank	2.23	2.60	2.45	2.47	2.69	2.08
	Mean Response	5.00	4.81	5.00	4.73	5.05	4.62
Strong Product Division Support	Mean Rank	3.46	2.93	2.71	3.67	2.61	3.96
	Mean Response	5.69	5.19	4.95	5.93	4.95	6.08
Establish Technology Is Mature	Mean Rank	2.85	2.48	2.66	2.57	2.41	2.96
	Mean Response	5.31	4.67	5.11	4.67	4.91	4.92
Establish Early Informational Linkage	Mean Rank	4.04	3.74	4.03	3.63	3.93	3.73
	Mean Response	6.15	5.91	6.00	6.00	6.00	6.00
n		13	21	19	15	21	13
Friedman Test Statistic		14.7	11.5	15.5	11.0	17.8	17.9
Kendall's Coefficient of Concordance (W)		.283	.137	.203	.189	.212	.34
Degrees of Freedom ($\nu_1;\nu_2$)		4;46	4;78	4;70	4;54	4;78	4;46
F Statistic		4.73	3.19	4.60	3.16	5.38	6.30
Level of Significance ($\hat{\alpha}$) ($2.8^{-3} = 2.8 \times 10^{-3}$, etc.)		2.8^{-3}	1.8^{-2}	2.3^{-3}	2.1^{-2}	7.0^{-4}	4.0^{-4}

TABLE F-II

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 7)

QUESTION 7: Before the ADTP assessment policy went into effect, the following factors represented a barrier to the transfer of ADP technology to system application.

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Inertia Barriers	Mean Rank	5.54	6.12	4.97	6.67	5.94	4.94	5.00
	Mean Response	5.11	5.35	4.88	5.33	5.67	4.75	5.00
Lack of Incentive Structure	Mean Rank	4.07	3.59	4.77	4.25	3.06	4.88	4.67
	Mean Response	4.18	3.35	5.18	3.67	3.22	5.13	5.22
Cost Barriers	Mean Rank	4.68	5.00	4.41	4.83	4.83	3.75	5.00
	Mean Response	4.61	4.24	4.94	4.00	4.44	4.25	5.56
Communication Barriers	Mean Rank	5.11	4.77	5.15	4.75	4.89	4.69	5.56
	Mean Response	4.92	4.24	5.47	4.33	4.56	5.13	5.78
Time Barriers	Mean Rank	5.17	5.03	5.50	4.50	5.89	4.88	6.06
	Mean Response	5.00	4.41	5.71	4.17	5.11	5.38	6.00
Geographic Distance	Mean Rank	2.55	2.50	2.53	3.00	2.39	3.06	2.06
	Mean Response	3.03	2.65	3.24	3.00	2.67	3.88	2.67
Transfer Management Structure	Mean Rank	5.24	5.71	4.94	4.00	6.39	5.38	4.56
	Mean Response	4.92	5.00	4.88	3.33	5.89	5.25	4.56
Technology Barriers	Mean Rank	3.65	3.29	3.74	4.00	2.61	4.44	3.11
	Mean Response	3.68	2.71	4.41	3.17	2.44	4.50	4.33
n		38	17	17	6	9	8	9
Friedman Test Statistic		51.9	35.0	21.1	9.35	28.9	6.02	21.1
Kendall's Coefficient of Concordance (W)		.195	.294	.177	.223	.458	.108	.336
Degrees of Freedom ($\nu_1;\nu_2$)		7;256	7;110	7;110	7;32	7;54	7;46	7;54
F Statistic		8.97	6.66	3.45	1.43	6.77	.844	4.04
Level of Significance ($\hat{\alpha}$) ($2.0^{-9} = 2.0 \times 10^{-9}$, etc.)		2.0^{-9}	1.4^{-6}	2.2^{-3}	2.3^{-1}	9.0^{-6}	5.6^{-1}	1.3^{-3}

TABLE F-II (CONTINUED)

QUESTION 7: Before the ADTP assessment policy went into effect, the following factors represented a barrier to the transfer of ADP technology to system application.

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Inertia Barriers	Mean Rank	5.89	5.33	6.05	4.90	5.83	5.08
	Mean Response	5.31	5.00	5.63	4.47	5.52	4.46
Lack of Incentive Structure	Mean Rank	3.77	4.43	3.87	4.57	4.41	3.81
	Mean Response	4.00	4.43	4.16	4.40	4.57	3.77
Cost Barriers	Mean Rank	4.62	4.76	4.66	4.77	4.31	5.35
	Mean Response	4.46	4.67	4.84	4.27	4.57	4.62
Communication Barriers	Mean Rank	4.73	5.10	4.32	5.77	4.98	4.92
	Mean Response	4.54	5.05	4.58	5.20	5.14	4.39
Time Barriers	Mean Rank	5.50	5.12	5.26	5.27	5.00	5.69
	Mean Response	4.92	5.14	5.16	4.93	5.19	4.85
Geographic Distance	Mean Rank	2.39	2.60	2.79	2.17	2.71	2.19
	Mean Response	3.00	2.91	3.37	2.40	3.33	2.31
Transfer Management Structure	Mean Rank	5.31	5.33	5.26	5.40	4.91	6.00
	Mean Response	4.77	5.05	4.90	5.00	4.81	5.15
Technology Barriers	Mean Rank	3.81	3.33	3.79	3.17	3.86	2.96
	Mean Response	3.85	3.38	4.00	3.00	4.00	2.85
n		13	21	19	15	21	13
Friedman Test Statistic		21.7	29.6	27.7	29.2	24.8	31.6
Kendall's Coefficient of Concordance (W)		.239	.202	.208	.278	.169	.347
Degrees of Freedom ($\nu_1;\nu_2$)		7;82	7;138	7;124	7;96	7;138	7;82
F Statistic		3.77	5.05	4.74	5.38	4.06	6.37
Level of Significance ($\hat{\alpha}$) ($1.4^{-3} = 1.4 \times 10^{-3}$, etc.)		1.4^{-3}	4.0^{-5}	9.6^{-5}	3.2^{-5}	4.5^{-4}	5.5^{-6}

TABLE F-III

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 8)

QUESTION 8: Now that the ADTP assessment policy is in effect, the following factors will represent (or "still represent") a barrier to the transfer of ADP technology to system application.

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Inertia Barriers	Mean Rank	5.82	6.62	5.27	7.00	6.50	5.44	5.11
	Mean Response	4.42	4.88	4.24	5.17	4.89	4.38	4.11
Lack of Incentive Structure	Mean Rank	4.55	3.82	5.24	3.92	3.83	4.88	5.56
	Mean Response	3.61	2.94	4.47	3.17	2.89	4.13	4.78
Cost Barriers	Mean Rank	5.26	4.74	5.59	4.33	4.61	4.94	6.17
	Mean Response	4.05	3.53	4.59	3.50	3.44	3.88	5.22
Communication Barriers	Mean Rank	3.59	3.59	3.71	4.67	2.89	3.94	3.50
	Mean Response	3.29	3.00	3.58	3.83	2.67	3.75	3.44
Time Barriers	Mean Rank	5.53	5.85	5.71	5.50	6.72	5.13	6.22
	Mean Response	4.24	4.24	4.82	4.17	4.78	4.38	5.22
Geographic Distance	Mean Rank	3.29	3.29	3.12	4.00	3.16	4.19	2.17
	Mean Response	2.87	2.56	3.12	3.17	2.44	3.88	2.44
Transfer Management Structure	Mean Rank	4.26	4.62	3.97	3.33	5.05	3.56	4.33
	Mean Response	3.47	3.59	3.47	2.67	4.11	3.00	3.89
Technology Barriers	Mean Rank	3.70	3.41	3.41	3.25	3.22	3.94	2.94
	Mean Response	2.90	2.41	3.18	2.50	2.33	3.13	3.22
n		38	17	17	6	9	8	9
Friedman Test Statistic		49.3	33.7	28.8	13.8	26.0	6.2	29.0
Kendall's Coefficient of Concordance (W)		.185	.283	.242	.329	.413	.111	.461
Degrees of Freedom ($\nu_1;\nu_2$)		7;256	7;110	7;110	7;32	7;54	7;46	7;54
F Statistic		8.41	6.33	5.11	2.45	5.62	.876	6.83
Level of Significance ($\hat{\alpha}$) ($3.0^{-10} = 3.0 \times 10^{-10}$, etc.)		3.0^{-10}	3.0^{-6}	4.7^{-5}	3.9^{-2}	6.6^{-5}	5.3^{-1}	8.2^{-6}

TABLE F-III (CONTINUED)

QUESTION 8: Now that the ADTP assessment policy is in effect, the following factors will represent (or "still represent") a barrier to the transfer of ADP technology to system application.

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Inertia Barriers	Mean Rank	6.81	5.41	6.08	5.77	6.02	5.81
	Mean Response	4.92	4.33	4.79	4.27	4.81	4.15
Lack of Incentive Structure	Mean Rank	4.27	4.74	4.16	5.07	4.38	4.85
	Mean Response	3.39	3.91	3.63	3.80	3.81	3.54
Cost Barriers	Mean Rank	5.39	5.02	5.42	4.83	5.14	5.19
	Mean Response	4.00	4.10	4.47	3.53	4.19	3.85
Communication Barriers	Mean Rank	3.54	3.71	3.24	4.17	3.79	3.42
	Mean Response	3.00	3.48	3.16	3.47	3.52	2.92
Time Barriers	Mean Rank	5.39	6.02	5.82	5.73	5.52	6.19
	Mean Response	4.00	4.86	4.68	4.33	4.62	4.39
Geographic Distance	Mean Rank	2.96	3.36	3.42	2.93	3.47	2.77
	Mean Response	2.77	2.91	3.21	2.40	3.24	2.23
Transfer Management Structure	Mean Rank	4.31	4.29	4.47	4.10	4.17	4.50
	Mean Response	3.62	3.48	4.00	2.93	3.52	3.54
Technology Barriers	Mean Rank	3.35	3.45	3.42	3.40	3.50	3.27
	Mean Response	2.71	2.81	3.05	2.47	2.91	2.62
n		13	21	19	15	21	13
Friedman Test Statistic		29.6	28.0	34.6	23.9	28.7	27.6
Kendall's Coefficient of Concordance (W)		.326	.197	.260	.227	.195	.303
Degrees of Freedom ($\nu_1;\nu_2$)		7;82	7;138	7;124	7;96	7;138	7;82
F Statistic		5.80	4.91	6.33	4.12	4.86	5.22
Level of Significance ($\hat{\alpha}$) ($1.8^{-5} = 1.8 \times 10^{-5}$, etc.)		1.8^{-5}	5.6^{-5}	2.3^{-6}	5.3^{-4}	6.4^{-5}	5.9^{-5}

TABLE F-IV

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 11)

Question 11: What is your best estimate of the percent of your working time that was spent communicating with personnel in the agencies listed below regarding new ADPs before the ADTP assessment requirement went into effect?

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Higher Headquarters	Mean Rank	3.42	4.06	2.77	4.25	3.83	3.06	2.50
	Mean Response	7.86	11.88	3.12	13.33	10.56	5.63	.89
Product Divisions	Mean Rank	3.33	3.38	3.24	2.92	3.72	2.38	3.56
	Mean Response	7.50	5.38	9.94	5.67	5.22	10.63	9.33
Laboratories	Mean Rank	3.78	3.22	4.27	3.50	2.94	4.31	4.22
	Mean Response	9.00	8.19	3.12	11.33	5.89	13.13	3.67
AFLC	Mean Rank	1.93	1.56	2.32	1.92	1.33	2.31	2.33
	Mean Response	.89	.81	1.06	.50	.89	1.25	.89
Operational Commands	Mean Rank	2.54	2.78	2.41	2.42	3.17	2.44	2.39
	Mean Response	3.00	5.31	1.18	3.83	6.67	1.88	.56
n		36	16	17	6	9	8	9
Friedman Test Statistic		43.3	25.5	27.8	10.8	15.5	13.6	16.3
Kendall's Coefficient of Concordance (W)		.301	.398	.409	.449	.431	.426	.453
Degrees of Freedom ($\nu_1;\nu_2$)		4;138	4;58	4;62	4;18	4;30	4;26	4;30
F Statistic		15.06	9.91	11.07	4.08	6.07	5.20	6.63
Level of Significance ($\hat{\alpha}$) ($3.1^{-10} = 3.1 \times 10^{-10}$, etc.)		3.1^{-10}	3.5^{-6}	7.7^{-7}	1.6^{-2}	1.1^{-3}	3.3^{-3}	6.0^{-4}

TABLE F-IV (CONTINUED)

Question 11: What is your best estimate of the percent of your working time that was spent communicating with personnel in the agencies listed below regarding new ADPs before the ADTP assessment requirement went into effect?

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Higher Headquarters	Mean Rank	2.96	3.68	3.11	3.79	3.21	3.71
	Mean Response	3.15	10.10	5.21	10.29	6.10	9.58
Product Divisions	Mean Rank	3.54	3.15	3.40	3.18	3.24	3.42
	Mean Response	2.15	11.35	5.90	10.21	9.62	4.42
Laboratories	Mean Rank	4.19	3.48	3.97	3.46	4.07	3.21
	Mean Response	4.62	10.45	8.42	7.79	10.10	4.75
AFLC	Mean Rank	1.85	2.03	2.13	1.71	2.14	1.63
	Mean Response	.46	1.25	1.16	.64	1.10	.67
Operational Commands	Mean Rank	2.46	2.68	2.40	2.86	2.33	3.04
	Mean Response	1.08	4.55	1.21	5.86	1.38	6.33
n		13	20	19	14	21	12
Friedman Test Statistic		24.1	18.9	25.2	17.4	30.5	14.75
Kendall's Coefficient of Concordance (W)		.464	.236	.332	.310	.363	.307
Degrees of Freedom ($\nu_1;\nu_2$)		4;46	4;74	4;70	4;50	4;78	4;42
F Statistic		10.37	5.88	8.94	5.85	11.41	4.88
Level of Significance ($\hat{\alpha}$) ($4.5^{-6} = 4.5 \times 10^{-6}$, etc.)		4.5^{-6}	3.7^{-4}	6.8^{-6}	6.1^{-4}	2.4^{-7}	2.5^{-3}

TABLE F-V

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 12)

Question 12: What is your best estimate of the percent of your working time that is or will be spent communicating with personnel in the agencies listed below regarding new ADPs now that the ADTP assessment requirement is in effect?

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Higher Headquarters	Mean Rank	3.21	3.69	2.71	4.08	3.33	2.69	2.72
	Mean Response	8.06	11.25	3.94	13.83	9.11	6.25	1.89
Product Divisions	Mean Rank	3.56	3.88	3.24	3.58	4.17	3.19	3.28
	Mean Response	8.67	7.44	10.18	7.67	7.00	10.13	10.22
Laboratories	Mean Rank	3.96	3.13	4.77	3.17	2.94	4.81	4.72
	Mean Response	10.17	8.44	9.77	11.50	5.67	13.00	6.89
AFLC	Mean Rank	1.81	1.53	2.12	1.83	1.33	2.00	2.22
	Mean Response	1.17	1.13	1.35	1.00	1.11	1.38	1.33
Operational Commands	Mean Rank	2.47	2.78	2.18	2.33	3.22	2.31	2.06
	Mean Response	4.14	6.88	1.82	7.50	7.00	2.75	1.00
n		36	16	17	6	9	8	9
Friedman Test Statistic		50.2	24.8	39.8	9.27	17.0	20.7	19.6
Kendall's Coefficient of Concordance (W)		.349	.387	.585	.386	.472	.647	.543
Degrees of Freedom ($\nu_1;\nu_2$)		4;138	4;58	4;62	4;18	4;30	4;26	4;30
F Statistic		18.76	9.47	22.54	3.15	7.16	12.81	9.51
Level of Significance ($\hat{\alpha}$) ($2.5^{-12} = 2.5 \times 10^{-12}$, etc.)		2.5^{-12}	5.8^{-6}	1.6^{-11}	4.0^{-2}	3.6^{-4}	6.9^{-6}	4.3^{-5}

TABLE F-V (CONTINUED)

Question 12: What is your best estimate of the percent of your working time that is or will be spent communicating with personnel in the agencies listed below regarding new ADPs now that the ADTP assessment requirement is in effect?

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Higher Headquarters	Mean Rank	3.00	3.30	3.13	3.25	3.10	3.33
	Mean Response	4.08	9.70	5.53	10.14	6.33	9.50
Product Divisions	Mean Rank	3.71	3.40	3.63	3.43	3.60	3.46
	Mean Response	3.77	12.15	7.42	10.79	10.81	5.42
Laboratories	Mean Rank	4.31	3.75	4.11	3.79	4.29	3.42
	Mean Response	7.39	10.25	8.53	9.93	11.24	5.42
AFLC	Mean Rank	1.73	1.90	1.95	1.68	1.88	1.75
	Mean Response	.77	1.55	1.58	.79	1.48	.83
Operational Commands	Mean Rank	2.19	2.65	2.18	2.86	2.14	3.04
	Mean Response	1.77	5.90	1.79	7.64	1.95	8.33
n		13	20	19	14	21	12
Friedman Test Statistic		28.6	20.0	31.3	16.8	40.8	11.08
Kendall's Coefficient of Concordance (W)		.550	.249	.411	.301	.486	.231
Degrees of Freedom ($\nu_1;\nu_2$)		4;46	4;74	4;70	4;50	4;78	4;42
F Statistic		14.6	6.31	12.59	59	18.91	3.30
Level of Significance ($\hat{\alpha}$) ($9.0^{-8} = 9.0 \times 10^{-8}$, etc.)		9.0^{-8}	2.0^{-4}	9.0^{-8}	8.5^{-4}	6.7^{-11}	1.9^{-2}

TABLE F-VI

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 15a)

Question 15a: If you work in a laboratory, how difficult is it (or "would it be") for you to obtain what you feel is reliable information on each of the following items to include in the technology program plan?

Respondents		Lab	Lab A	Lab B
Payoff	Mean Rank	3.53	4.17	3.50
	Mean Response	4.41	5.17	4.33
Schedules	Mean Rank	3.56	3.75	3.22
	Mean Response	4.41	4.67	4.00
ADP Cost Estimates	Mean Rank	2.71	3.00	2.28
	Mean Response	3.65	4.17	3.22
Priority	Mean Rank	2.15	1.92	2.28
	Mean Response	3.00	3.00	3.22
Alternate Approaches	Mean Rank	3.06	2.17	3.72
	Mean Response	4.00	3.50	4.44
n		17	6	9
Friedman Test Statistic		10.9	10.1	6.7
Kendall's Coefficient of Concordance (W)		.160	.421	.212
Degrees of Freedom ($\nu_1;\nu_2$)		4;62	4;18	4;30
F Statistic		3.04	3.64	2.16
Level of Significance ($\hat{\alpha}$) ($2.4^{-2} = 2.4 \times 10^{-2}$, etc.)		2.4^{-2}	2.4^{-2}	9.8^{-2}

TABLE F-VII

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 16a)

Question 16a: If you work in a product division, how difficult is it (or "would it be") for you to perform what you feel is a reliable assessment of an ADP with respect to each of the following items?

Respondents		P.D.	P.D. A	P.D. B
Payoff	Mean Rank	3.38	3.25	3.50
	Mean Response	4.18	3.25	5.00
Schedules	Mean Rank	2.97	2.94	3.00
	Mean Response	3.71	3.13	4.22
ADP Cost Estimates	Mean Rank	2.24	1.88	2.56
	Mean Response	3.24	2.50	3.89
Priority	Mean Rank	3.32	3.56	3.11
	Mean Response	3.94	3.50	4.33
Decision Options	Mean Rank	3.09	3.38	2.83
	Mean Response	4.24	3.88	4.56
n		15	8	9
Friedman Test Statistic		7.3	6.9	2.4
Kendall's Coefficient of Concordance (W)		.108	.215	.066
Degrees of Freedom ($\nu_1;\nu_2$)		4;62	4;26	4;30
F Statistic		1.93	1.92	.561
Level of Significance ($\hat{\alpha}$) ($1.2^{-1} = 1.2 \times 10^{-1}$, etc.)		1.2^{-1}	1.4^{-1}	6.9^{-1}

TABLE F-VIII

RESULTS OF COEFFICIENT OF CONCORDANCE TESTS (QUESTION 19)

Question 19: Please indicate the extent that you agree or disagree that these ideas have enough merit to warrant further consideration.

Respondents		All	Lab	P.D.	Lab A	Lab B	P.D. A	P.D. B
Product Divisions Rate Labs	Mean Rank	3.46	3.38	3.65	3.08	3.56	3.56	3.72
	Mean Response	4.24	3.94	4.82	3.67	3.67	4.50	5.11
Labs Rate Product Divisions	Mean Rank	3.18	3.00	3.41	3.08	3.00	3.13	3.67
	Mean Response	3.95	3.59	4.53	3.67	3.22	4.25	4.78
Both (1) and (2)	Mean Rank	3.22	3.24	3.27	3.08	3.44	3.13	3.39
	Mean Response	4.03	3.77	4.53	3.67	3.56	4.25	4.78
Make Future Funding Contingent Past Transfers	Mean Rank	2.11	2.21	2.06	2.75	1.67	2.06	2.06
	Mean Response	2.79	2.59	3.24	3.00	2.11	3.38	3.11
Establish Technology Transfer Agency	Mean Rank	3.03	3.18	2.62	3.00	3.33	3.13	2.17
	Mean Response	3.68	3.71	3.47	3.33	4.00	4.00	3.00
n		38	17	17	6	9	8	9
Friedman Test Statistic		25.6	9.2	16.1	.4	12.0	5.9	13.1
Kendall's Coefficient of Concordance (W)		.168	.135	.237	.018	.334	.184	.363
Degrees of Freedom ($\nu_1;\nu_2$)		4;146	4;62	4;62	4;18	4;30	4;26	4;30
F Statistic		7.48	2.49	4.98	.091	4.02	1.58	4.56
Level of Significance ($\hat{\alpha}$) ($1.7^{-5} = 1.7 \times 10^{-5}$, etc.)		1.7^{-5}	5.2^{-2}	1.5^{-3}	9.9^{-1}	1.0^{-2}	2.1^{-1}	5.4^{-3}

TABLE F-VIII (CONTINUED)

Question 19: Please indicate the extent that you agree or disagree that these ideas have enough merit to warrant further consideration.

Respondents		GS 15 LC & Above	GS 14 Maj & Below	Over 20 Years	Under 20 Years	More Than 2 Yrs	Less Than 2 Yrs
Product Divisions Rate Labs	Mean Rank	3.65	3.43	3.66	3.33	3.64	3.31
	Mean Response	4.08	4.57	4.63	4.07	4.67	3.92
Labs Rate Product Divisions	Mean Rank	3.50	3.02	3.47	2.87	3.21	3.19
	Mean Response	3.77	4.24	4.37	3.67	4.24	3.77
Both (1) and (2)	Mean Rank	3.31	3.21	3.53	2.90	3.36	3.08
	Mean Response	3.77	4.38	4.47	3.73	4.38	3.77
Make Future Funding Contingent Past Transfers	Mean Rank	2.12	2.14	1.63	2.77	1.95	2.42
	Mean Response	2.85	2.95	2.79	3.07	2.95	2.85
Establish Technology Transfer Agency	Mean Rank	2.42	3.19	2.71	3.13	2.83	3.00
	Mean Response	3.00	3.95	3.63	3.53	3.62	3.54
n		13	21	19	15	21	13
Friedman Test Statistic		12.8	13.5	29.5	2.15	21.12	3.66
Kendall's Coefficient of Concordance (W)		.247	.161	.388	.036	.251	.070
Degrees of Freedom ($\nu_1;\nu_2$)		4;46	4;78	4;70	4;54	4;78	4;46
F Statistic		3.93	3.84	11.42	.520	6.72	.907
Level of Significance ($\hat{\alpha}$) ($7.9^{-3} = 7.9 \times 10^{-3}$, etc.)		7.9^{-3}	6.7^{-3}	3.4^{-7}	7.2^{-1}	1.1^{-4}	4.7^{-1}

Vita

Captain Richard L. Robinson was born 20 April 1943 in Mineral Wells, Texas. His parents are Mr. and Mrs. Lee Robinson. He graduated from high school in 1961 and received a Bachelor of Science Degree in Aerospace Engineering from the University of Texas at Austin in 1966. Before entering the Air Force in 1968, Captain Robinson was employed by McDonnell Douglas Astronautics where he was assigned to the Gemini-B Aerodynamics Group. He received his commission from Officer Training School in 1969 and was subsequently assigned to the Space and Missle System Organization. Prior to being assigned to the Air Force Institute of Technology, he was assigned to the Headquarters Air Force Satellite Control Facility.

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Recent studies conducted by the United States Air Force concluded that closer ties should be established between the laboratories and product divisions of the Air Force Systems Command. Toward this end, the Air Force Systems Command has established a policy whereby the product divisions will assess advanced development technology programs conducted by the laboratories. This research effort is a study to determine the perceived effectiveness of this assessment policy. Thirty-eight structured interviews were held with laboratory

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and product division personnel. The perceived effect of the assessment policy on technology transfer, communication, and dialogue, and the perceived significance of several barriers to technology transfer were discussed during these interviews. Other issues discussed were the ease or difficulty of accomplishing key assessment tasks, the responsiveness of laboratories to product divisions, the attitude of laboratory and product division personnel with respect to the assessment policy, and the desirability of encorporating additional technology transfer mechanisms. The writer concluded that those interviewed perceived that the assessment policy will tend to enhance technology transfer, communication, and dialogue. Also, no significant problems were perceived to exist in accomplishing the assessment tasks. Generally, those interviewed perceived that the laboratories will not tend to be more responsive than they should be. A favorable attitude toward the assessment policy was expressed, but the additional technology transfer mechanisms were not strongly endorsed.