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PERSONNEL SUBSYSTEM MANAGEMENT OF ELECTRONIC SYSTEMS

William H. Hendrix, Captain, USAF

May 1971

TECHNICAL REQUIREMENTS AND STANDARDS OFFICE
HQ ELECTRONIC SYSTEMS DIVISION (AFSC)
L. G. Hanscom Field, Bedford, Massachusetts 01730

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FOREWORD

Our military systems require the use of man to operate, maintain, control, and provide support. The management of this human resource is entitled "Personnel Subsystem Management."

This Technical Report provides the ESD program/project and staff offices with a management tool to better plan, develop, and implement the Personnel Subsystem. This will enhance human performance and lead to reduced demands for manpower, skills, training, and procedural data; all of which contribute to more cost effective systems, equipment, and facilities. In the final analysis, the overall effectiveness of an electronic system will be largely determined by the actual performance of its operators, maintainers, controllers, and supporters; the people who actually transform the hardware into a dynamic operational system, subsystem, or facility. To this end, the Personnel Subsystem provides a vital role in the development of programs and projects within the Electronic Systems Division.

The contribution of Major Donald S. Fujii; USAF Academy, Colorado, to this Technical Report has been especially noteworthy in providing both general guidance and specific facts which were based on his research involved in developing SAMSOM 375-1.

This Technical Report has been reviewed and is approved.

Carmine Pinto

CARMINE PINTO, Chief
Tech Rqmts & Stds Office

ABSTRACT

Personnel Subsystem Management within the Electronic Systems Division is presented. Presentation includes a description of the functional areas of the Personnel Subsystem, and those events which lead to an effective personnel Subsystem within the system acquisition process. The Personnel Subsystem requirements for each phase of the system acquisition life cycle are presented as an integral part of the system management process.

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CHAPTER 1

INTRODUCTION

1-1. General. This Technical Report is applicable to all conceptual studies, engineering projects, advanced development projects, and in all system/equipment procurements requiring engineering analysis, such as, system programs, Class V modifications, etc.

1-2. Objectives:

a. To provide guidance to implement the policies and directions issued by higher headquarters.

b. To provide guidance procedures for development of PS requirements.

c. To identify PS procedures and methodologies which are essential throughout the life cycle of a system.

d. To provide the newly assigned PS Manager and Project Manager with a basic understanding of the PS.

1-3. References. Reference documents (regulations, manuals, specifications, etc.), cited in this manual are listed in Attachment 1.

1-4. Terms. A glossary of terms used in this manual is provided in Attachment 2.

CHAPTER 2

PERSONNEL SUBSYSTEM - GENERAL

2-1. Human Resources:

a. A major resource required for all Air Force systems is manpower or human resources. The Air Force must have men to operate, maintain, control, and support every system in its current operational inventory. Even with the advent of high speed computers and the greater reliance on automation, it still takes men or human resources to transform engineering marvels into live, functional forces. Complex and sophisticated hardware, without human resources, are about as functional as a powerful and expensive sports car without its driver. Therefore, the Air Force must treat human resources on an equal basis with hardware to have systems that are capable of accomplishing intended missions in the most effective and efficient manner possible.

b. The Air Force realizes the critical role of human resources in systems development and has created a functional specialty called the PS. During February of 1960, in a formal effort to integrate the various human factors areas involved in the development of new Air Force systems, the former Air Research and Development Command (ARDC) and the Air Training Command (ATC) issued a joint policy statement pertaining to a management concept entitled "The Personnel Subsystem." This policy was subsequently coordinated with the former Air Material Command (AMC) in August 1960, and the amended statement became the official basis for the application of human factors in the development of new system. In 1961, the Personnel Subsystem concept was formalized by the publication of AFL 375-5 which, in 1962, evolved into AFR 30-8, "Development of a Personnel Subsystem for Aerospace Systems." On 23 September 1970, this Personnel Subsystem regulation was revised and placed in the "80" series of regulations. This regulation, AFR 80-46, is the present USAF Personnel Subsystem policy document.

c. Unfortunately, the Air Force has not always taken full advantage of the potential dividends that are inherent in the PS. This Technical Report (TR) is designed to give you the tools to reap the potential dividends. Before going any further, let's consider the words "human resources" and "human performance." The use of the word "human performance" is more appropriate when dealing with the Personnel Subsystem; therefore, in most cases we shall use this term instead of "human resources." In general, the tendency has been to consider human performance as a mere adjunct to the hardware. More specifically, human performance is considered after a particular hardware design has been selected. This approach has often resulted in serious problems during the operational phase of a system. Recently, such factors as the greater demand for highly skilled personnel, the need for longer and more intensive training periods, the low retention rates in certain Air Force Specialties, and the skyrocketing operating and maintenance costs have increased the severity of the problems. This, in turn, has caused great concern among the upper level managers and they have realized the need to consider human performance concurrently with hardware designs. The costs

that are associated with the personnel in a system do not appear to be very significant when they are viewed within the framework of the initial procurement costs; however, when one considers these costs in relation to the total life cycle costs, they do become quite significant. The Personnel Subsystem, therefore, is responsible for the development of a system's human performance, it is a definite factor in systems development. Dividends, in the form or reduced total life cycle costs, may be realized by the Air Force when it places equal emphasis upon a system's human performance factor with that of hardware.

2-2. Genealogy of PS. PS evolved from an assemblage of scientific disciplines and technical specialties, such as, Psychology, Physiology, Personnel Selection, Training, Human Factors Engineering, Bioastronautics, Ergonomics, Anthropometry, Training Equipment, etc., all of which are concerned with man. These disciplines and specialties have generated a large amount of information which is applicable to and which may be utilized in optimizing man's role within a system. This information has been packaged so it can be utilized in developing the human performance that is necessary to operate, maintain, control, and support our complex, sophisticated, and expensive systems, equipment, and facilities.

2-3. Official Definition. AFR 80-46 states that "the total planning, integration, design, and development tasks required to provide the efficient human performance in a system is the personnel subsystem." This definition gives one a good, general idea of what the Personnel Subsystem is and what it does; however, for the task of obtaining a deeper understanding of the PS, we shall now discuss the PS elements.

2-4. PS Elements. AFR 80-46, lists seven elements of the PS which may be selectively applied for a particular program or project. The details of each PS element and its associated management milestones will differ for each program and project and must be defined, scheduled, prepared, integrated, and coordinated with the other PS elements and system parameters. We shall review each of the elements, however, before proceeding any further, you are reminded that no rigid sequence is intended in the order of listing as each element is interrelated and concurrent development is the rule rather than the exception.

a. Human Engineering (HE). This element, as defined within the context of the PS concept, is concerned with the design of hardware so it can be operated, maintained, controlled, and supported by personnel so their performance contributes to the overall system effectiveness. HE contributes to the achievement of system performance requirements by recommending the most cost effective use of man as a system component. It reduces the system demands upon manpower, skills, training, procedural data and dollars. More specifically, it is the designing of human tasks and working environments so they are compatible with the sensory, perceptual, mental, physical and other attributes of the personnel who are or will be available for assignment to the system. Traditionally, the optimum design of equipment or hardware as it interfaces with man has been of primary importance. However, with the advent of increasingly complex systems, the man-to-man interactions or links have become progressively critical to a system's overall attained performance. It must

be understood that the term Human Engineering is vested with a wide variety of meanings, depending upon who is using it, and the context in which it is used. In practice, HE may vary from the mere inspection of a drawing during a design review to a series of detailed tests and studies on a full-scale mockup. During the past decade, emphasis was placed upon the man versus machine question; today, we must place our emphasis upon the best combination of man and machine as well as the man-to-man links.

b. Biomedical Support. This element encompasses all areas that require special provisions for the promotion of health and safety, and the protection, sustenance, escape, survival, and recovery of personnel who are employed within the total system complex. It is concerned with both normal and emergency conditions, and includes health protection from system functions for personnel who are not included in the total system complex. In general, it is devoted to the physiological and psychological well-being of man. Limited biomedical support considerations are usually managed by a PS Manager, but considerations associated with a full-fledged program may be of a magnitude which requires expertise not available in the SPO. In this case, the PS Manager has to draw on outside biomedical assistance from an organization, such as, Air Force Systems Command's (AFSC's) Aerospace Medical Division (AMD).

c. Personnel Planning Information (PPI). This element, which rescinded the element called Personnel-Equipment Data (PED), is concerned with the data that are used in the planning for system personnel, manpower, and training. Personnel Planning Information (PPI) originates as manpower and training guidance information furnished by Hq USAF. Throughout the life cycle of the system, PPI is definitized and updated, and in its final form includes data furnished by the contractor in accordance with AFR 310-1.

(1) Qualitative and Quantitative Personnel Requirements Information (QQPRI) Report. This report contains the types and number of personnel who are required to operate, maintain, control, and support the system being developed. It is a planning document that is used to program the acquisition, training, and utilization of the personnel who are needed to transform the hardware into an operational system. QQPRI represents both product and process. The process is characterized by the analysis and grouping of human tasks into duties, positions, and Air Force Specialty Codes (AFSCs). The QQPRI Report represents the product of this process. A survey that was initiated at the request of the Hq AFSC Personnel Subsystem Working Group revealed that the QQPRI Report is used by AFSC, ATC, AFLC, the using commands and Hq USAF. MIL-D-26239A, an Air Force specification that is entitled, "Data, Qualitative and Quantitative Personnel Requirements Information," contains the formats and procedures for preparing Part I and Part II of the QQPRI Report. Part I (Field and Organizational Maintenance) is designed to serve as a source of data for such related actions as development or revision of USAF personnel concepts or policies; the manning and utilization of personnel; and the development or revision of maintenance and operational plans and concepts.

Part II (Depot-Level Maintenance) is designed to serve as a source of data for development or revision of depot maintenance plans and concepts. In summary, the QQPRI Report is used as a basis upon which trade-offs are made between the ideal or desired manning situation and the actual availability of skilled and trained personnel within the Air Force's personnel inventory.

(2) Training Equipment Planning Information (TEPI) Report. This report is the basis for identifying the components of the training equipment package as defined in AFR 50-19. It is normally prepared by the system contractor and represents his recommendations as to the types and quantities of training equipment the Air Force should purchase to support all training that is required by the system personnel. Because of the long lead times required to develop complex training equipment, this report should be a product of the Contract Validation Phase or definition effort. It enables Air Training Command to compare the anticipated training requirements with the courses, facilities, and equipment presently available in ATC and to compile a list of training equipment that will have to be funded, scheduled and acquired during training equipment development.

d. Training Plan (TP). The Training Plan is an evolutionary planning document initiated early in the conceptual phase and periodically updated and definitized throughout the system life cycle. The TP will include or cross-reference source information, such as:

(1) The system training objectives.

(2) The personnel and training concepts.

(3) The ATC individual training plans.

(4) Training planning information.

(5) The using command operational readiness training plan.

(6) The estimated dates for start and completion of all system training.

(7) Lists of facilities, equipment, and other requirements necessary to accomplish training in support of the system.

In addition, the personnel subsystem manager will:

(1) Insure that the TP is prepared, integrated and constantly updated as required to support system objectives and schedules.

(2) Coordinate the TP to prevent all unnecessary duplication of training or equipment, and to eliminate conflicts the schedules.

(3) Utilize the TP as a source document for the personnel subsystem section of the system planning documents.

e. System Trained Personnel Requirements (System TPR). System TPR is a tabulated list of personnel who will require system-peculiar training before they will be able to support the system being developed. This element contains the time-phased requirements for officers, airmen, and civilians by Air Force Specialty Code, grade, and command. It is basic to the determination of the final training programs, the development of training plans, and the computation of training costs. The PS Manager will initiate, coordinate and maintain a system TPR by utilizing inputs from participating commands. Hq ATC is notified of the special training requirements under the provisions of AFR 50-9, by the using command initiating AF Form 403.

f. Training/Training Support (T/TS). This element includes ATC-managed training, using command training, training support data, training equipment (including training aerospace ground equipment and spares), and maintenance/training facilities.

(1) ATC-Managed Training:

(a) Contractor Training (Type 1). This is formal training, either technical or flying, contracted with civilian industrial or educational institutions, as outlined in AFR 50-9. It may be conducted at either the contractor's location or at an Air Force Base.

(b) ATC-conducted Training. This training includes:

1. ATC Special Training (Type 2). This is formal training of a one-time nature which is conducted by ATC instructors at an ATC base, contractor facility, or other designated site. Responsibilities are as delineated in AFR 50-9.

2. Resident Regular Training (Type 3). This is formal training of a continuing nature which is conducted at an ATC installation. It includes basic, lateral, advanced, and supplemental courses.

3. Field Training(Type 4). This is special or regular on-site training which is conducted by a field training detachment, or by a mobile training team from an ATC Training Center. The responsibilities for special field training are specified in AFR 50-9; for regular field training, see AFR 50-29.

(c) Other Agency Training (Type 5). This is special or regular formal training which is conducted for the Air Force by the Army, Navy, or other government agency (or by an Air Force agency other than ATC).

(d) Contract Technical Training (Type 6). Regular training conducted by civilian educational institutions, under provisions other than AFR 50-9. This is regular training which is conducted by civilian educational institutions.

(2) Using Command Training. The training which is conducted by the using command includes:

(a) Operational Readiness Training (ORT). ORT refers to the consolidated instruction by which the personnel who are qualified in their respective specialties are trained together, to perform simultaneous and sequential duties.

(b) On-the-job Training (OJT). A training program of supervised instruction designed to qualify an airman to perform a given Air Force Specialty (AFS) while working in a duty assignment of that AFS.

(3) Training Support Data (TSD). TSD, as defined in AFR 8-2, includes technical manuals, preliminary technical orders, job performance aids, and other contractor-prepared data procured especially to support training requirements. The personnel subsystem manager is responsible for system management activities required to obtain TSD in support of training plans. The responsibility for technical orders is normally exclusively limited to training related data.

(4) Training Equipment Development (TED). This element is comprised of the actions that are required to define, program, budget contract, develop, produce, acquire, and support a system's training equipment package defined in AFR 50-19. More specifically, training equipment is divided into three classes to facilitate its procurement, support, cataloging, and management.

(a) Class I Training Equipment - Trainers. Distinctive configuration items (CIs) of training equipment that are developed, designed, engineered, fabricated, or assembled, either by a contractor, or by the Air Force, to meet specific training objectives; the CIs require AFLC or AFSC logistic support, and are catalogued in Federal Supply Classification (FSC) Group 69. They are acquired and supported through regular systems procedures. To qualify as Class I, locally assembled trainers must require depot maintenance configuration control or time compliance technical order (TCTO) type support based on either training or maintenance requirements. The CIs include:

1. Simulators - Training devices, machines, or apparatuses that synthetically reproduce a desired condition or set of conditions. Usually, they are relatively complex devices, reproducing by electronic or mechanical means all conditions necessary for an individual or crew to practice operational tasks to meet training objectives. The simulator represents the operational equipment physically and functionally and follows the mathematical equations that describe performance.

2. Part Task Trainers - Trainers that provide students or crews practice selected aspects of a task or operation independent of other tasks or operations.

3. Training Attachments - Training configuration items that must be used in conjunction with other trainers to perform

their intended training functions; e.g., radar and visual flight attachments.

(b) Class II Training Equipment. Parts, components, configuration items. Items intended for use in their original configuration. They may or may not need to be updated or modified to remain compatible with operational equipment, and may require support as configuration items. Requirements are established through AFR 375 series procedures and included in the appropriate budget and buying programs. These items retain their FSC regardless of how they are used; that is, whether they are used as entities, combined with other training items, placed on a stand to facilitate training, or used in maintenance support of training. The following are representative Class II training equipment:

1. Equipment Groups - Items used individually or combined through mechanical or electrical connections to provide inspection, maintenance, calibration, operation, and identification training.

2. Individual Items - Replacement items and recoverable components (commonly called "bench items") that are used as configuration items for disassembly, calibration, and familiarization in approved maintenance training courses.

(c) Class III Training Equipment - Training Aids. This class is made up of items that facilitate teaching by visual or auditory means. They are used to communicate information, concepts or ideas to the student, and to demonstrate or portray the functional characteristics of configuration items without actually using the operational item. Class III items generally do not require depot support. Representative training aids in this class are:

1. Animated Panels - Representations of system components or subsystems, mounted on display surfaces and showing important linkages and interactions. They are used to teach nomenclature, principles, and operational theories.

2. Cutaways - Components with portions of their surface coverings removed to expose internal parts and to show interior construction or operation.

3. Exploded Displays - Arrangements of actual component parts separated sufficiently to show each part in its order of assembly.

4. Site Displays - Miniature models, usually made to scale, showing the placement of various related specialized shelters, storage tanks, launching pads, silos, erectors, etc., such as those required at an operational missile site, radar site, or other installation.

5. Training Films - Motion picture films produced and developed to support training objectives.

6. Charts and Transparencies - Illustrations of equipment, wiring diagrams, schematics, etc., used as instructional aids.

(d) Mobile Training Units. In addition to the previously discussed classes of training equipment, a very important part of Training Equipment Development is that which pertains to Mobile Training Units (MTUs). These units are portable sets of training equipment (Classes I, II, and III), special tools, test equipment, and training aids designed for use in the field primarily for maintenance training. In summary, the PS element called Training Equipment Development (TED) has become increasingly critical as the increasing complexity of our hardware requires a corresponding increase in training equipment.

(e) Government Furnished Property (GFP) Training Equipment. Training equipment needed to support AFR 50-9 Special Training will be programmed and acquired in accordance with AFM 67-1 and other related policies and procedures established by AFSC, AFLC, and ATC.

(5) Training Facilities. For the purpose of Personnel Subsystem development, this element includes all real estate and buildings that will be utilized exclusively in support of training programs. It is concerned with the tentative identification of training facility requirements and the progressive refinement and "firming" of them during the Contract Validation Phase (Contract Definition Phase). The facilities can consist of the simple identification of in-being classrooms, modification of existing facilities, or new construction that requires an addition to the Military Construction Program.

g. Personnel Subsystem Test and Evaluation (PST&E). This element results in the preparation of a coordinated PST&E Plan that becomes an integral part of the System Test Plan or the Category I and II Test Plans. The PST&E Plan is an integral part of the formal coordinated testing that starts during Category I (Cat I) Testing and continues through Operational Test and Evaluation (includes Category III Testing) until it is verified that the system can be operated, maintained, controlled, and supported by the system personnel. This element completes our review of the seven PS elements which was intended to give you an understanding of the Air Force's PS.

h. Summary. Because it takes highly skilled and specialized personnel to operate, maintain, control, and support the Air Force's complex, sophisticated, and expensive systems, equipment and facilities; the associated training programs, time required for training, cost of training, and amount of training equipment, etc., have made the costs that are associated with the required human performance a factor of great significance in a system's total life cycle cost. In general, the Air Force must be willing to invest more dollars in and place greater emphasis upon the development of human performance. Only then will it be able to realize the potential that is designed into its hardware. The Air Force must consider man as a possible system constraint because the present day human performance demands have caused such distantly related factors as low retention rates, higher overhead costs, etc., to have a crucial

impact upon the cost, schedule, and performance parameters of the systems that are currently entering the Air Force operational inventory. The Air Force's PS has been developed to the point where it is presently capable of manipulating the human performance so hardware design can be maximized and still meet the overall constraints of cost, schedule and performance. This is not an indorsement for the unlimited application of a human performance oriented approach, for this type of philosophy is just as detrimental to the overall development of a system as the present philosophy that places primary emphasis upon the hardware. Rather, what is proposed is a moderate and logical approach that recognizes the PS considerations as integral and inseparable part of the total system. In essence, the Air Force must selectively apply PS considerations by tailoring the degree of effort each program's or project's real, hard-core needs. Only then will the Air Force be able to realize a cost effective use of our national resources - both human and material. Now let's consider the people who are charged with the responsibility of planning, programming and executing the actual development of the PS - the members of the PS Team.

2-5. PS Team:

a. Requirements for Effective PS Management. Effective PS Management is necessary if the Air Force hopes to produce and deliver integrated man-machine systems that are fully operational by the scheduled dates. In general, the effective management of a PS program requires:

(1) Recognition of the PS as an integral part of, and vital to the acquisition and successful deployment of a system.

(2) Management of the PS program as an entity by a designated group of specialists with specific technical qualifications and management responsibilities.

(3) Designation of milestones at which progress in PS activities can be objectively reviewed and reported.

(4) Application and integration of PS with sound System Engineering principles and techniques.

(5) Avoidance of duplicative data collection, analysis, and reporting by integrating system and equipment analyses to form common technical data that can be used in planning and expediting the development of PS processes and products, as well as hardware and logistics elements.

(6) Establishment of effective procedures to keep technical data current and accurate in relation to hardware design and configuration decisions.

(7) Establishment of a responsible "closed-loop" system to insure immediate attention to design deficiencies that could jeopardize the chances of obtaining correct and reliable human performance in the system.

b. Centralized Management Control of PS. The PS Development Program is a part of the System Engineering Program and is complementary to Maintainability, Reliability, Safety, and Integrated Logistics Support. PS must be managed as a "package" so its development, documentation, and test, and evaluation are integrated with the procedures that govern the hardware portions of the system. To accomplish this integration, primary management responsibility for the PS is assigned to the System Program Director. He is responsible for the overall direction, programming, evaluation and integration of PS into the engineering, test, and support activities that are conducted during the validation and development phases of a system's life cycle. Since PS Development must be responsive to the evolutionary nature of systems acquisition, it must be managed as an integral part of the Program Control, System Engineering, Configuration Management, Test and Data Management functions. PS management procedures are based upon the requirements for centralized control of:

(1) Human Engineering.

(2) Biomedical Support.

(3) Personnel Planning Information.

(4) Training Programs.

(5) Training Equipment.

(6) Human Performance Test and Evaluation.

c. The Team Approach to PS Development. The primary management force for establishing and integrating the PS program within a program or project office is the PS team. This team is a vital part of the System Program Office (SPO) organization and is established once the requirement for a SPO cadre is identified.

(1) General Principles. Because all of the PS elements are not developed solely by AFSC, the System Program Director (SPD) or Project Manager must appoint a PS Manager and form a PS team that is composed of representatives from each command or agency that has a functional association with any of the PS elements. The primary objective of the team approach is to establish working relationships and channels of communication that are suited to the program's or project's PS needs. It is recommended that all Exploratory and Advanced Development Programs identify individuals within the participating organizations as PS points-of-contact. This establishes a firm toe-hold from which the timely and effective development of the PS may arise.

(2) The PS Manager. AFR 80-46 directs that a Personnel Subsystem Manager be appointed within a SPO upon receipt of the directive that initiates the program. He should be involved in the development of preliminary cost, schedule and performance objectives. He is responsible for providing the PS inputs into such documents as preliminary trade-off studies, preliminary design studies, and the Concept Formulation Package/Technical Development Plan (CFP/TDP). Prior to the

formation of an official PS team, the PS Manager should solicit the support of the participating commands for their PS inputs. Once the PS team is formed, he becomes the PST chairman and serves as the link between the System Program Director and all organizations and agencies having an interest in PS.

(a) Responsibilities. The PS Manager is totally responsible to the System Program Director for managing the collective PS efforts of all participating commands and agencies. As chairman of the PS team, he must insure that all of the PS elements are properly planned, scoped, tailored, and implemented so PS development remains within the constraints of cost, schedule, and performance that are levied upon the program or project. The PS Manager's specific responsibilities include:

1. Identifying and insuring the timely development and programming of the applicable PS elements.

2. Developing and maintaining the required documentation and reports for management and record purposes.

3. Identifying and justifying PS funding requirements and insuring that adequate financial support data is contained in the Concept Formulation Package/Technical Development Plan, Proposed System Package Plan, and the System Package Program.

4. Scheduling and rescheduling, as necessary, the programmed events or actions required to promote effective relationships and integration of the PS elements.

5. Insuring the timely establishment of detailed PS objectives and the assignment of specific responsibilities to the PS team members.

6. Incorporating PS requirements into work statements, specifications, contract data requirements lists, etc., as required, to obtain specified PS products and data on a timely basis.

7. Establishing and implementing procedures for collecting, correlating, and displaying information relating to PS actions and events.

8. Serving as a member of the Configuration Control Board to insure that all human performance requirements are included in the specifications, changes, etc., as appropriate.

9. Acting as the Air Force point of contact for contractors in the performance of their functions in the PS program, including training equipment development.

10. Advising the System Program Director of PS programming changes that impact significantly upon the overall system program.

11. Insuring the PS activities and products are complementary to, and compatible with, other system development activities, such as: Data Management; Configuration Management; System Engineering; Reliability; Maintainability; Safety Engineering; and Integrated Logistics Support.

(b) Qualifications. AFR 80-46 states the Personnel Subsystem Manager will be appointed from AFSC 2955, Personnel Subsystem Officer; or 2675A, Human Performance Engineer.

1. Personnel Subsystem Officer. Because of the significant impact of the early PS management decisions upon training, operating, and maintenance costs, the System Program Director must exercise considerable care in selecting his PS Manager. It is recommended that he choose, whenever possible, a responsible individual whose qualifications equal or exceed those of Air Force Specialty Code 2955, "Personnel Subsystem Officer." This specialty requires a Bachelor's degree in science or engineering with specialization preferred in Industrial or Experimental Psychology, Human Factors Engineering or Industrial Engineering. A Master's degree in Human Factors Engineering or Industrial Engineering is desirable.

2. Human Performance Engineer. On some programs or projects where the PS requirements are clustered primarily around the Human Engineering functional area, the System Program Director or Project Manager may select a responsible individual whose qualifications equal or exceed those of Air Force Specialty Code 2675A, "Behavioral Scientist," with an "A" shredout as a "Human Performance Engineer." This specialty requires a Master's degree in Human Factors Engineering or Psychology, with a Doctor's degree desirable, and a minimum of 24 months of appropriate experience. For further information on both specialties, consult AFM 36-1, Officer Classification Manual.

(3) The PS Team. Qualified PS specialists are needed in connection with the identification, definition, development and acquisition of a system, including: design studies; preparation of work statements, preparation of a preliminary system specification, review and evaluation of contractor proposals, source selections, and subsequent programs pursued with applicable contractors. Although PS specialists (2955s or 2675As) are often assigned to a system program office or project office during the Conceptual Phase, the PS team is not ordinarily fully manned until the beginning of the Validation Phase. The PS team is established and used by the System Program Director to ensure that the necessary technical support is employed in developing and implementing the applicable PS elements.

(a) Responsibilities. The PS team is responsible for identifying the specific PS requirements for the system; integrating the PS requirements into source selections and contractor proposal evaluations; updating PS requirements as necessary for use by the contractors selected for the formal system validation and full-scale development efforts; minimizing duplication of effort; and maintaining surveillance over the contractor's PS activities. The PS team prepares

PS annexes that become a part of work statements which, in turn, become part of the Request for Proposal (RFP), and reviews and evaluates the proposals prepared by the offerors. In some cases, the PS team is responsible for the in-house preparation of such Personnel Planning documents as the Qualitative and Quantitative Personnel Requirements Information (QQPRI) and Training Equipment Planning Information (TEPI) Reports. It continues its activities in the subsequent development, implementation, and acquisition of PS data and products during the Development Phase. PS team members should actively participate in design reviews and engineering inspections to insure that human engineering, biomedical support and training equipment requirements are adequately provided for and effectively evaluated. Other PS elements, such as, Personnel Planning Information, are also reviewed and appropriate action is taken to insure that all of the applicable elements are properly integrated into the basic objectives of each design review and engineering effort. The PS team also participates in the Category I and II Tests. In conclusion, the PS team is responsible to the PS Manager and assists and supports him in performing the functions that enable him to manage the development of an efficient, effective, and timely PS program.

(b) Composition and Qualifications:

1. The composition of the PS team may vary in terms of specific program or project PS requirements and the particular phase of development. Its membership is comprised of representatives from Air Force Systems Command (AFSC), Air Force Logistics Command (AFLC), Air Training Command (ATC), the using command and other organizations having a major interest in the system equipment, or facility. The MITRE Corporation and contractor personnel may be included as necessary. The PS Manager may solicit support from the Aerospace Medical Division (AMD) for biomedical support inputs into the program or project documentation, and Human Engineering assistance. He may also solicit support from the AFSC Test Centers - such as, the Armament Development and Test Center at Eglin AFB and Rome Air Development Center, Rome, N. Y., through the appropriate Electronic Systems Division Office of Primary Responsibility (ESD OPR), for inputs to Personnel Subsystem Test and Evaluation (PST&E) Plans, and from the Air Force Human Resource Laboratory, Brooks AFB, Texas, and its Personnel And Training Research Divisions for assistance in developing manpower and training requirements.

2. The permanent PS team should be selected on the basis of the human performance requirements of the particular program or project. For a major operational development effort with a full-fledged PS program, the PS team should include individuals who are professionally qualified in the areas of Human Engineering, Personnel Planning, Training, Training Equipment, and Biomedical Support. In addition to the PS team members, the PS Staff Officer in the Technical Integration Division, Technical Requirements and Standards Office will monitor the PS program and assist the PS managers.

d. The PS Team in Industry. Because of the dissimilar organizational structures among the contractors, the individual contractors will organize their PS organizations in different ways. Air Force experience has proven that some form of the team approach is the most effective means of accomplishing PS objectives. However, this should not be interpreted as an officially indorsed Air Force position that all technical specialties must be integrated into a single independent group within a company. In most cases, the PS program can be organized so it is readily integrated with, and enhances the effectiveness of the existing management structure. Whether or not the various PS specialties are united organizationally, it is desirable that they work as a team, participating in the system engineering process, making human engineering decisions, defining biomedical support requirements, identifying personnel requirements, recommending training equipment needs, and performing whatever PS functions that are required by the particular program or project. While each participant may be a specialist, the team approach is needed to facilitate communication, minimize duplication and insure the optimal integration of PS and hardware activities. In order to get the overall PS effort accomplished effectively, Air Force managers should ensure the following conditions are met before letting a contract:

(1) Assignment of competent and qualified human factors personnel (those with a Master's degree) to design teams.

(2) Placement of the technical management and integration of the overall PS program at a high enough level to preclude a "bits and pieces" effort.

(3) Adoption of the PS team approach so it complements the system management procedures.

This concludes the discussion on the description of the PS and the people who manage and carry out the actual details of PS Development. Chapter 3 directs attention to the specifics of Personnel Subsystem Development.

CHAPTER 3

PERSONNEL SUBSYSTEM DEVELOPMENT

3-1. Introduction:

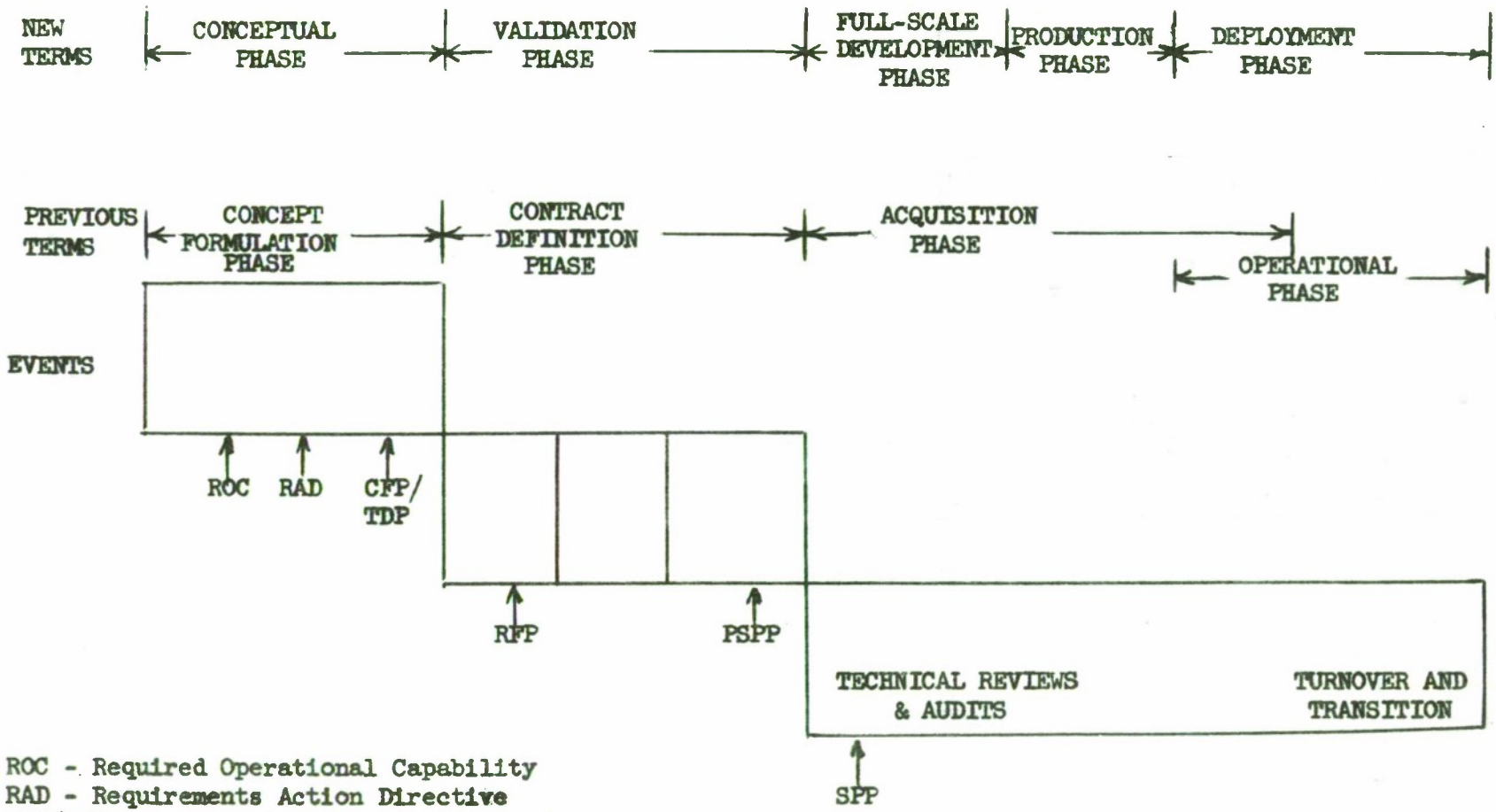
a. Throughout this chapter, we shall examine the manner in which PS is developed and managed by considering the systems management activities that are associated with the PS Elements and by viewing both the activities and elements against the backdrop of the System Acquisition Life Cycle.

b. In other words, we shall take a chronological survey of each of the major System Acquisition Life Cycle Phases and shall describe how PS is developed and managed at specific points within each phase. This approach is rather complicated, but it does represent the real world situation - it will enable PS management personnel to see how the PS evolves from the gross conceptual stage to the production and deployment stage. The specific sequence of systems management activities will vary with the individual project or program, therefore, the procedures in this chapter should be accepted as an illustrative teaching aid rather than a management "cookbook."

c. In Figure 1 "System Acquisition Life Cycle," the phases of the cycle are broken out as well as the events which occur within each phase. This figure should be referred to as each phase is discussed. Caution is advised when viewing the figure. The figure shows the total number of phases involved in acquiring a major system plus some of the events that occur. However, it is not intended to imply that all of these phases have to be completed for all programs or that all of the events listed have to be accomplished. Even the events listed may occur in different phases than those indicated. The intention of the figure is only to provide a time sequence of events that can be discussed in a logical manner. The phases and events which actually occur will vary depending upon the program, and the management of the program rests directly with the System Program Director.

3-2. Conceptual Phase:

a. Exploratory Development. When the technological know-how required to satisfy an operational need or deficiency is not readily available or when continued technological advances are pursued, Exploratory Development Programs or Projects are initiated to establish the technological building blocks to provide the missing know-how and expand the boundaries of technology. On such programs/projects, the PS Monitor is interested in the impact, if any, which human performance may have upon the project's/program's feasibility and practicability. This is normally accomplished by establishing a PS task in the Exploratory Development SOW or plan. In most cases, the task has to be described in general terms and should direct the contractor or in-house agency to consider the role and impact of man upon the hardware as well as the impact of the hardware upon the



ROC - Required Operational Capability
RAD - Requirements Action Directive
CFP/TDP - Concept Formulation Package/ Technical Development Plan
PSPP - Proposed System Package Plan
SPP - System Package Program

Figure 1. System Acquisition Life Cycle

personnel resources. As an example, if the project/program is concerned with the development of a new electronic system, the PS tasks should task the contractor or in-house agency to determine if unique skills are anticipated, and to determine if there are hazards, such as, radiation, that will have a detrimental effect upon the operators, and maintainers.

b. Advanced Development. This approach is selected whenever there is a need to reduce the technical risk in a later Engineering Development or Operational Systems Development and involves the development of an experimental system or equipment for operational demonstration. With respect to PS, we are interested in obtaining more detailed information on the impact the hardware will have upon the personnel resources and the constraints which man may impose upon the hardware design. Again, we normally accomplish this by establishing a PS task in the Advanced Development SOW or plan. This is the time to ask for a description of the basic manning concept that is recommended for the operation maintenance of the system, equipment, or facility should it become operational. The word "basic" is underlined to emphasize the following point - we do not want a detailed description of the numbers and types of system personnel. More specifically, we want to know if the contractor or in-house agency recommends a complement of Air Force or "blue-suit" personnel to operate and maintain the hardware; a complement of contractor personnel; or a combination of Air Force and contractor personnel. If possible, we should also ask for a description of the new Air Force Specialty Codes that are anticipated in the event the hardware is introduced into the operational inventory.

c. Concept Formulation Package/Technical Development Plan (CFP/TDP). The specific content of each CFP/TDP will vary; however, each must contain sections entitled "Rationale," "System Description," and "Program Description." These sections may or may not require the discussion of PS implications that could affect the program. The final decision rests with the PS Monitor who assists in the preparation of the three sections and should be reviewed before one prepares or reviews a CFP/TDP (see AFSCR 80-3).

d. SPO Cadre Established:

(1) The SPO cadre is established in accordance with AFSCR 375-7. The cadre serves as the task force for performing the preliminary planning for the system validation phase and includes the development of the manpower requirements to manage the program as it progresses through the following phases. Close coordination with the using and participating commands is extremely important at this point as this is the opportune time to assure the early identification of their respective manpower requirements. With respect to PS Management, AFR 80-46 indicates that the SPD will establish a PS team once the requirement for a SPO cadre is established. The team will function throughout the systems acquisition life cycle, and insure that:

(a) All personnel subsystem objectives and requirements are accomplished.

(b) Full personnel subsystem technical support is made available.

(c) All of the interested agencies are represented in each personnel subsystem decision.

(2) Once a PS team is formed, the PS Manager (PS Team chairman) will then review all of the requirements needed to execute and support the program's PS development effort. The PS Manager should devote particular attention to the requirements for Personnel Subsystem Test and Evaluation (PST&E) support from any of the Air Force and contractor test centers and facilities, as this critical element is often overlooked. If there are PST&E support requirements, the PS Manager should contact the PS personnel at the centers and facilities to determine what support and test equipment are available. This will enable him to program for additional personnel and test equipment as well as the dates they should be available.

3-3. **Validation Phase:**

a. System Management Directive (SMD) Issued. After higher headquarters reviews the CFP/TDP, the Secretary of Defense may grant conditional approval for the Air Force to proceed into the Validation Phase, or he may direct the continuation of further study on the concept being advocated. If approval is given, it will be in the form of a SMD that is issued by Hq USAF. AFSC then issues AFSC Form 56, "AFSC Program Direction," which will direct the SPO to prepare the preliminary program documentation and may specify the requirements for a Management Techniques Application Plan (MTAP). The fundamental objectives of the MTAP are to plan management actions in advance and to integrate functions so program objectives may be accomplished without duplication of effort. As far as the PS is concerned, the MTAP is vital to its future role in the program. Without a PS reference in the MTAP, there will be no system management basis for a PS program. If there are PS requirements in your program, it is important that you insure that one of the PS documents listed in Part C, Attachment 1, AFSCR 375-2, is placed on the list. All PS personnel are encouraged to review AFSCR 375-2 since the MTAP is the vehicle by which PS establishes a toe-hold in Systems Management. Another vital point associated with the SMD or DD is that of waivers. AFR 80-46 states that elements of the personnel subsystem may be deleted by Hq USAF, through program directives, or by the program director.

b. Formal SPO/Project Office Established. Once the formal SPO/Project Office is established, the PS Manager should insure that he has a fully-manned PS team with representatives from all participating commands and agencies. Also he should insure that all of the representatives are aware of their respective responsibilities, understand the need for the team approach in developing the PS program, and are able to devote sufficient time to carry out their specific tasks.

c. Engineering Development. This approach is selected when technology is sufficiently in hand and the system, equipment or facility can be approved for eventual service use. Engineering Development can be accomplished in either validation phase or full-scale development phase and it includes those development programs being engineered for service use, but which have not yet been approved for procurement or operation. The PS inputs that accompany this approach should include an analysis of the impact of the development on the using commands proposed organizational structure, operations and maintenance concepts, and personnel utilization policies. This analysis should include special manpower requirements and anticipated problem areas. The basic manning concept outlined in advanced development should be expanded by specifying manpower requirements (including grade and AFSC structure), and complement of contractor personnel.

d. RFP Prepared. The RFP sets the pace for the entire PS Program. Therefore, it behooves all of the PS team members to prepare accurate and realistic PS inputs that will lead a truly cost effective baseline.

(1) Preliminary PS Inputs:

(a) This is a very critical step as the preparation of the preliminary PS inputs for the documents that comprise the RFP affects the entire PS program. In other words, the PS requirements in the preliminary documentation serves as the foundation upon which the entire PS effort is built. Without an adequate force of qualified PS personnel (PS team members) the PS baseline will be put together in an incomplete and haphazard manner and lack cohesiveness in thought and organization. Thus, the SPD and the PS Manager must make every effort to have a fully-manned and qualified team of PS personnel "on board" at this stage of the System Acquisition Life Cycle.

(b) One of the first tasks that confronts the PS team is the preparation of the PS portion of a Selection Plan. This plan outlines and relates the important performance characteristics to operational effectiveness, describes the method to be used to select prospective sources (offerors) to insure adequate competition is obtained while limiting the number of requested proposals to an economical and manageable quantity. The plan states the recommended general and specific criteria to be used in evaluating the proposals, shows the Source Selection Authority (SSA), Source Selection Advisory Council(SSAC), and Source Selection Evaluation Board (SSEB) organizations - recommending key members by name, In addition, it describes the SSEB evaluation method and scoring, and the SSAC evaluation and analysis techniques, narratively states the source selection activities within a time framework, in sufficient detail to allow the reviewing authorities to determine the practicality of the planned source selection, and makes a direct correlation between itself and the Advanced Procurement Planning documents.

(c) If PS technique(s) have been included in the MTAP, the PS team will be required to assist in the preparation of the Selection Plan. Experience has proven that this is a rather formidable

task as the RFP is often in a very primitive stage of development and tangible facts are almost non-existent. However, there is no need to give up as there is a step by step solution to this dilemma.

1. The first step is to determine how the SPO has decided to divide the evaluation criteria into "areas," "items," and "factors." Although there is no firm ground rule, traditionally, there have been five areas: technical/scientific; operational; logistics; management/production; and cost. PS is usually placed under the technical/scientific area. The actual structuring of the areas will depend upon the particular procurement situation. Once the areas are identified, they are subdivided into items that define the scope and nature of each area. In addition, each item is often subdivided into factors which represent the basic working unit of proposal evaluation. During the division process, the criteria must be written with clear lines of demarcation to eliminate duplication and overlap in the evaluation process. PS as an item, for example, may be divided into the following factors:

a. Contractor's/Offeror's PS Organization.

b. Human Engineering.

c. Personnel Planning Information.

d. Training .

e. Biomedical Support.

f. Personnel Subsystem Test Evaluation

2. The second step is to prepare a description and standard for each PS factor. The purpose of the description is to provide the evaluator(s) with a basic idea of the specific PS facets in the Offerors' proposals that will be scrutinized. The standards are designed to indicate the quality and quantity of performance the Air Force expects or desires from each Offeror on each of the PS factors. They provide an objective basis for evaluating the submitted PS data and reports and reduce the temptation of comparing one offeror against another. Figure 2 is an example of how PS factors may be described and contains samples of PS standards.

3. The third step is to portray graphically how well each PS factor meets its respective standard. Specific methodology will be established by the Technical Evaluation Board Chairman. In any event, the acceptability or unacceptability of offerors proposal will be determined as well as a detailed discussion of the factor's strong points, weak points, or any deviations requested.

4. The fourth step is to prepare a summary that indicates the effect of the PS factors upon the PS item.

5. The fifth and last step is the formating of a deficiency report. For the purpose of proposal evaluation, a "deficiency"

PERSONNEL SUBSYSTEM FACTORS/DESCRIPTIONS AND STANDARDS

FACTOR	DESCRIPTION	STANDARD
1. PS Organization	This factor includes a description of the offeror's PS Organization & its functions; a description of his PS personnel, their qualifications & the time they will devote to the program; & the relationship of PS with his other disciplines.	The offeror will meet the standard if he discusses the manner in which he has organized his PS Organization to support the PS needs of the program; identifies the PS personnel who shall be assigned to the program on a full-time and part-time basis; and describes the manner in which PS shall be integrated with the related disciplines.
2. Human Engineering (HE)	This factor is concerned with the manner in which the offeror intends to comply with MIL-H-46855 & MIL-STD-1472.	The offeror will meet the the standard if he discusses the manner in which he shall comply with MIL-H-46855 & MIL-STD-1472A. He will be given credit if he (1) considers the human capabilities and limitations in the design of the control/display consoles, (2) integrates HE into the design review cycle, (3) considers large scale displays with respect to character size, legibility, readability,etc, & (4) considers HE design criteria in his facility designs & layouts.
3. Personnel Planning Information (PPI)	This factor includes a description of PPI and its status, & a discussion of how the QQPRI(Data Item Q-103 & MIL-STD-26239) will be tailored to the program.	The offeror will meet the standard if he discusses the preliminary QQPRI & Training Equipment Planning Information(TEPI). He will be given credit if he (1) goes into detail & scopes his QQPRI effort to the actual needs of the program, (2) proposes a unique approach in preparing the QQPRI Report, (3) understands the current AF approach in AFR 80-46 for developing QQPRI, & (4) discusses how TEPI will be used for training purposes.

Figure 2

FACTOR	DESCRIPTION	STANDARD
4. Training	This factor includes a description of ATC/ADC Training Support, Type I Training, On-the-Job Training, & Training Equipment.	The offeror will meet the standard if he proposes a training program centered around OJT & Type I Training, & discusses his training equipment concept. He will be given credit if he relates his OJT schedule to the major program milestones & proposes a way to minimize or eliminate the need for training equipment.
5. Biomedical Support	This factor is concerned with the description of the potential biomedical hazards and the coordination between the AF and the offeror on this matter.	The offeror will meet the standard if he describes how he proposes to develop biomedical support criteria to reduce or eliminate biomedical hazards & describes how he intends to coordinate these actions with the AF. He will be given credit if he shows an understanding of how biomedical support criteria may affect the design of the equipment & facilities.
6. Personnel Subsystem Test and Evaluation (PST&E)	This factor is concerned with the identification & description of the major system test & evaluation categories; identification & selection of tasks for analysis; description of test management; preparation of schedule & identification milestones identification of test support requirements; identification of test.	The offeror will meet the standard if he (1) identifies the major test & evaluation categories, (2) identifies the important human performance tasks requiring detailed analysis, (3) describes his proposed management structure for conducting PST&E (4) describes his PST&E Schedule, (5) identifies the test support requirements in a satisfactory manner, (6) provides an adequate definition of the PST&E objectives, (7) adequately identifies the basic test methods & planning factors required to meet the PST&E objectives.

Figure 2 (continued)

is defined as an element of the offeror's proposal that fails to meet the standard, or is an omission of the data needed to compare the proposal with the standards. The fundamental purpose of deficiency reports is to provide the SPO with a quick and accurate method to determine what corrective actions are necessary to insure that known deficiencies can and will be rectified. In addition, they are used for the fact finding that normally precedes the drawing up of a definitive contract, and often serves as a debriefing guide. AFM 70-10 is an excellent source for reviewing the basic procedures on source selection and is recommended reading for all PS managers.

(2) RFP Requirements for Contractor-Conducted Validation Phase:

(a) Evaluation Criteria. The PS Manager should insure that PS is listed as an item under the specific area to which PS is assigned (technical/scientific.)

(b) Master Schedule. The PS Team should insure that the major PS milestones, e.g., training start dates, are reflected in the Master Schedule.

(c) Validation Phase SOW. The major PS input into the Validation Phase SOW is a PS Annex. For specific guidance in preparing this annex, refer to Attachment 11 of AFSCM 70-5 which contains both preparation instructions and an outline. The basic purpose of the PS Annex is to identify the PS tasks that the offeror must accomplish; the technical constraints imposed upon these tasks; and the relationship with other tasks and requirements. In other words, the annex should tell the offeror what PS elements are pertinent to the program, the degree to which each shall be developed, and to further identify, define, amplify and update the preliminary PS requirements. The tasks and requirements in the PS annex must be intimately related to the PS requirements in the System Specification (MIL-STD-490 Type A Specification) and the PS data items ("Q" items). The contents of typical PS Annex are shown in Figure 3. The key point to remember while preparing the PS Annex is to resist the temptation of extracting words directly from the sample in AFSCM 70-5 or using it as a "cookbook." This approach will not result in a cost effective PS baseline. The PS team must tailor the PS tasks and requirements in the annex to the specific needs of the program in question. This is a difficult task, but the investment of time and effort at this point will result in substantial savings in time and effort during the latter stages of the System Acquisition Life Cycle.

(d) Documentation Requirements. The PS documentation requirements are identified via data items listed on DD Form 1423 (Contract Data Requirements List), commonly referred to as the"CDRL." Since data and reports that are deliverable by the offeror represents dollars, the PS team members must make every effort to keep the number of PS data and reports down to the bare minimum. The prime criterion for requiring data should be whether it will be of significant

TYPICAL PERSONNEL SUBSYSTEM ANNEX (VALIDATION PHASE)

1.0 Purpose

2.0 Scope

3.0 Task Requirements

- 3.1 Narrative Description and Special Instructions
  - 3.1.1 Personnel Subsystem Development Plan (PSDP)
  - 3.1.2 Human Engineering
  - 3.1.3 Biomedical
  - 3.1.4 Personnel Planning Information
  - 3.1.5 Training
  - 3.1.6 Design Considerations
  - 3.1.7 Training Equipment
  - 3.1.8 Personnel Subsystem Test & Evaluation (PST&E) Plan
- 3.2 Technical Specifications/Standards/Administrative Directives
- 3.3 Administrative and Reference Directives
- 3.4 Relationships
  - 3.4.1 Relationship to Other Tasks
  - 3.4.2 Relationship to Work Breakdown Structure (WBS) & Cost Information Submitted to the Government

Figure 3

assistance to the Air Force in validating the best approach, making the major program decisions, selecting the best offeror, and preparing the Full Scale Development phase contract. The data and reports to be delivered are listed on a CDRL that is attached to the Validation Phase SOW. The individual PS or "Q" data items are described on DD-Forms 1664. For each data item, the CDRL is divided into 26 blocks which, in turn, enable the PS personnel to describe, modify, schedule, and price each item. All PS team members should be thoroughly familiar with AFR 310-1 and Volume II of AFSCM 310-1. The latter lists the data items that are authorized under the Air Force's Contractor Data Management Program. Figure 4 contains a list of the authorized "Q" data items. A discussion on how the data items are modified to fit the needs of a program will be held in abeyance until the discussion on the requirements for the Full Scale Development Phase.

(e) Preliminary System Specification. The preparation of PS inputs for the System Specification (MIL-STD-490 Type A Specification) should be accomplished by the PS Team by completing the following paragraphs which are cited in MIL-STD-490, Appendix 1:

1. Paragraph 3.3.7, Human Performance/Engineering.

2. Paragraphs 3.6, 3.6.1, and 3.6.2; Personnel and Training.

The PS requirements in the System Specification will determine the tasks that are delineated in the Validation and Full Scale Development Phase PS annexes. Refer to Attachment 3 of this manual for a more detailed account of preparing the System Specification PS paragraphs.

(3) RFP Requirements for the Full Scale Development Phase.

(a) Schedule. The PS team should insure that the Master Schedule for this phase contains the critical PS milestones. As a general guideline, all PS events or activities that fall into one or more of the following categories should be considered as potential PS milestones for the Master Schedule.

1. PS events which require approval or assistance of a higher headquarters.

2. PS events whose slippage will disrupt another event in the system acquistiion process.

3. PS events which signal an action to be performed by another major command or higher headquarters.

4. Starting and completion dates of major PS events.

(b) Specimen Statement of Work (SOW) for Full Scale Development Phase. The major PS input into the Full Scale Development Phase SOW is a PS Annex. For specific guidance in preparing this annex,

FUNCTIONAL CATEGORY Q/PERSONNEL SUBSYSTEM DATA ITEMS

Data Item	Title
Q-101-1	Personnel Subsystem Development Plan
Q-102-1	Training Equipment Planning Information (TEPI)
Q-103-1	Qualitative & Quantitative Personnel Requirements Information Part I: Field & Organization Maintenance
Q-104-1	Qualitative & Quantitative Personnel Requirements Information Part II: Depot Level Support
Q-105-1	Training Equipment Progress Report
Q-106-1	Training Equipment List
Q-107-1	Training Equipment Government-Furnished Property List
Q-108-1	Training Support Data
Q-109-1	Detailed Human Engineering Plan
Q-110-1	Life Support/Biomedical Problems Data
Q-111-1	Human Engineering Design Approach Document
Q-112-1	Medical Incident Report
Q-113-1	Crew Provisions Report
Q-114-2	Crew Station Subsystem(s) Design & Descriptive Data
Q-115-1	Training Plan
Q-116-1	Human Engineering Deviation Reports
Q-117-1	Evaluation Needs/Exercise Requirements Analysis
Q-118-1	Human Operator Task Analysis for Information Systems
Q-119-1	Training Needs/Exercise Requirements Analysis
Q-120-1	Exercising Capability Implementation Plan
Q-121-1	System Exercising Problem Package
Q-122-3	Personnel Subsystem Test & Evaluation Plan
Q-123-1	Synthetic Inputs Operator Guide
Q-124-1	Evaluation Manual (Information System Exercising Personnel)
Q-125-1	Exercise Conduct Manual

Figure 4

refer to Attachment 11 of AFSCM 70-5. The basic purpose of this annex is to provide a "strawman" which will guide the contractor as he prepares a definitized PS Annex prior to and during the negotiation on the Full Scale Development Phase contract. This annex is prepared concurrently with the Validation Phase PS Annex to insure the contents of both documents are consistent and properly correlated. The Full Scale Development Phase PS Annex is an integral part of the Specimen SOW for the Full Scale Development Phase, which eventually evolves into the final contract SOW for this phase. Attachment 4 is a sample of a Full Scale Development PS Annex that was tailored to the needs of a program. This appendix is provided for illustrative purposes and should not be used in "cookbook" fashion.

(c) Contract Data Requirements. The PS data and reports that complement the PS Annex are listed on DD Form 1423, the CDRL. Each "Q" data item must be tailored to the specific needs and requirements of the program. This is accomplished by inserting modifying instructions in Block 16 of the CDRL. Attachment 5 is an example of "Q" data items that were modified to fit the needs of a specific program. In the event the authorized "Q" data items do not meet the needs of a program, the PS team has to develop and prepare unique or "U" Forms 1664. When there is no requirement for the actual delivery of PS data or reports, but the PS team members desire to have the information available for review at the contractor's facility, the words "deferred delivery" are entered in Block 12 of the applicable data item as it is listed on the CDRL. If this not accomplished, a contractor is not obligated to let the PS team members have access to PS data at his facility. The fundamental "Q" data item for PS personnel is Data Item Q-101-1, Personnel Subsystem Development Plan. This item provides the offeror/bidder/contractor with an outline of the PS program as it is envisioned by the PS team or PS monitor. Once Q-101-1 is modified and tailored, if necessary, the offeror/bidder/contractor uses it as the primary vehicle for expressing his understanding of the PS. Your attention is directed to the outline of Q-101-1 which references data items Q-103-1, Q-109-1, and Q-122-3. Therefore, these items should not be listed on the CDRL whenever Q-101-1 is procured. Doing so may result in the Air Force paying twice for identical data. Besides the "Q" items, the PS team should insure that PS development considerations are properly covered in related data items, such as, T-101-1 (System Test Plan) which interfaces with Q-122-3, T-1-2-1 (Category I Test Plan/Procedures), and with T-1-6-1 (Category II Test Plan/Procedures).

(d) RFP Coordinated With Staff Agencies. All program and project offices that prepare SOWs and associated documents are required by AFLCM/AFSCM 57-7, ESD Sup 1, to obtain staff coordination before a RFP, Invitation for Bid, or a contract SOW may be submitted to the Procurement Committee for review. It is recommended that all PS managers/monitors precoordinate their documents with the Staff Personnel Subsystem Officer before seeking formal coordination. This step will permit the coordinating and reviewing agencies to gain a thorough understanding of the documents technical contents and recent PS policies.

e. SSEB Evaluates Proposals. During this stage, the PS team members use the criteria and standards that were previously developed to evaluate the PS portions of the offerors' proposals.

f. SSAC Evaluates Proposals and SSEB Findings. Once the PS members of the SSEB have completed their factor rating sheets, narratives, and deficiency reports, their counterparts on the SSAC complete the PS evaluation process by assigning weights to the PS factors and reviewing the PS comments and findings.

g. RFP Requirements Updated. This update is concerned with the changes, modifications, additions, etc., that are required as a result of negotiations and instructions from higher headquarters. The PS team members should: (1) insure that the PS tasks and instructions given to the competing contractors are current and identical; and, (2) change and update the PS criteria and standards for future use.

h. Air Force Conducts Technical Transfusion. The PS team members should consolidate the strong points from both proposals, to the extent of the Government's need and rights in the data. This represents the end of the basic PS management actions that form the foundation upon which the entire Full Scale Development Phase PS Program rests.

3-4. Full Scale Development/Production Phase:

a. PSPP, SPP Prepared & Program Requirements Baseline Updated. (See ESDM 375-1). We will summarize from a PS point of view some of the more important sections in the PSPP and describe how PS inputs are normally prepared for each section.

(1) Section 2 - Schedules:

(a) Description. This section is comprised of: a master schedule that provides a generalized picture of the major milestones, key events, and/or critical actions that pertain to the system, its subsystems, and major equipment that are vital to the timely execution of the system program; and supplemental schedules that are related to the timely accomplishment of the system program objectives and those required by other sections of the PSPP.

(b) PS Inputs. During the preparation of the PSPP, the primary concern of the PS Manager is to insure that all aspects of the PS are properly considered and evaluated, and that the PS requirements are clearly documented with respect to Contract Validation Phase Studies. Specific inputs include, but are not limited to the following examples:

1. Incorporation of PS Annexes into the RFP.

2. Submission of Personnel Planning Information.

3. Identification of training facilities.

4. Delivery of first items of training equipment to meet testing and classroom requirements.

5. Beginning of the first Career Field Training class.

(2) Section 3 - Program Management:

(a) Description. This section provides the organizations outside the SPO with a summary of the management structure and procedures that are applicable to the system program. It accomplishes the following:

1. Identifies all participating contractors and key subcontractors along with a brief description of their roles in the system program.

2. Specifies the responsibilities of each Air Force agency and the broad functions to be performed by other Government agencies.

3. Identifies the advisory groups and committees which the SPD feels may be required, and defines their functions.

4. Specifies the types of data and management reports to be provided.

5. Shows the organizational locations and functional elements of the SPO.

6. Outlines the Configuration Control Procedures.

7. Covers the security instructions and security responsibilities of supporting and participating activities.

(b) PS Inputs. Identify the agencies and Air Force commands represented on the PS team and explain their functions and responsibilities. Also, specify any arrangements made with appropriate contractors and AFSC agencies, e.g., test centers, for PS development. If available, the details surrounding the responsibilities and interrelationships of the PS team with other SPO functional areas should be stated.

(3) Section 5 - Operations:

(a) Description. The information in this section is the principal source of guidance for preparing Sections 6 through 11. It consists of a summary of the detailed Operational Plan of the using command, with appropriate cross-referencing to supplemental documents. This section is based upon the RAD and incorporates the expanded operational concept for use of the system as formulated during the Validation Phase. It identifies and describes the system mission and the system or capability being enhanced or replaced, including: mission; limitations;

employment; deployment; readiness; unit maintenance, supply and transportation; meteorological, environmental, and biomedical support factors; command and control requirements; organizational structure; manpower; personnel; career field training; facilities; operational readiness dates; special weapons and related training; and operational readiness training.

(b) PS Inputs. The contents of this section are critical to PS development, as the using command's proposed organizational structure, operations and maintenance concepts, and personnel utilization elements must be developed. This section should include, but not be limited to, the following essential cornerstones upon which the PS program will be built.

1. Manning Plan. Describe the manning concept with respect to the operations and maintenance of the system in its intended operational environment. (When the concepts are not firm, logical alternatives should be specified.) The plan should contain the following:

a. Personnel utilization policies.

b. Assumptions used concerning personnel acquisition, rotation, retention, and release.

c. Biomedical support and associated safety requirements.

d. Special manning requirements and anticipated problem areas, e.g., requirements for higher-than-normal grade structure, isolated duty, extremely hazardous duty, and button-up operations.

2. Operational Readiness Training (ORT) Plan Summary. Prepare a summary of the ORT Plan, including the facilities and equipment that is required. When an ORT Plan has not been formulated at the time this section is prepared, provide a schedule to indicate when the information will be available. Include the following in the summary:

a. Assumptions concerning the quality and quantity of incoming or input personnel.

b. The relationship of the ORT Plan to the System Training Concept in Section 10.

c. The special concepts and requirements concerning the utilization of operator and maintenance training programs, OJT, training equipment, training equipment support, and contractor personnel required for ORT.

3. Operational Readiness Criteria. Establish the criteria for determining and measuring the proficiency and operational readiness of operator and maintenance personnel at the operational sites. Include special equipment requirements when appropriate.

4. PS Products and Processes. Identify the specific requirements for the PS products and processes such as those listed below:

a. PS Development Plan.

b. Human Engineering Plan.

c. Qualitative and Quantitative Personnel Requirements Information (QQPRI) Report.

d. PS Test and Evaluation Plan.

(4) Section 6 - Acquisition:

(a) Description. Initially, this section is based on the qualitative requirements and then on the quantitative requirements as they are established. It describes the development-test-production plan to achieve the system program objectives. It provides a brief description of the major subsystems and covers the following:

1. The approach and operational considerations in promoting reliability and maintainability.

2. Value Engineering.

3. Quality Assurance.

4. Safety Engineering.

5. Configuration Management.

6. PS Development.

7. Advanced Procurement Planning.

8. Other development, test, and production information of special interests.

(b) PS Inputs. Include a complete description of the approach, interrelationships, and techniques to be employed by the SPO in developing the PS. Report specific deviations from the provisions of AFR 80-46. List the acquisition aspects of each PS element with cross-references to those elements in the other PSPP sections. Identify specific responsibilities for accomplishing each PS element, or cross-reference Section 3, if these responsibilities are detailed there. Insure that each applicable PS element is adequately covered in accordance with the following guidelines:

1. Human Engineering. Include the requirements for Human Engineering and progress reporting. Identify the analyses and reports that are required by the SPO to insure optimum utilization of man in the system. The requirements should be in accordance with

MIL-H-46855 (Human Engineering Requirements for Military Systems, Equipment and Facilities) and MIL-STD-1472A (Human Engineering Design Criteria for Military Systems, Equipment and Facilities).

2. Biomedical Support. Although Biomedical Support considerations are summarized comprehensively in Section 16, cross-reference this element and relate it to this and other sections as appropriate. Because basic system design may be affected by the physiological and psychological characteristics of man, you should include biomedical support considerations in the Concept Formulation studies and document them in the PSPP.

3. Personnel Planning Information. Identify the data which will be required to conduct planning for system personnel, manpower, and training. This data is normally derived from the system engineering process and is an integral part of the System Specification of systems or projects designated for systems management. The detail of the Personnel Planning Information requirements must be tailored to the development status, complexity, and schedule of the system or equipment program, as well as the stated needs of the supporting and using commands. On some operational system developments, when the requirement for formal planning documents are established by Hq USAF, ATC, AFLC, or the using command, a QQPRI Report and/or Training Equipment Planning Information (TEPI) may be procured.

4. Training Plans. While formal training plans are not part of the system program documentation, include the schedules for their preparation and insert condensed versions of these plans in Section 5 under Operational Readiness Training and in Section 10 under Career Field Training.

5. System Trained Personnel Requirements. Describe the procedures to be used by the PS team in developing the System Trained Personnel Requirements (Systems-TPRs) and cross-reference Section 10 for the actual requirements.

6. Training/Training Support (T/TS) Element. The following areas should be addressed:

a. ATC-Managed Training.

b. Using Command Training.

c. Training Support Data (TSD).

(1) Training Equipment Development. Document the Training Equipment Development reports that are required, but define the training equipment requirements in Sections 5 and 10, the logistics requirements in Section 8, the funding requirements in Section 11, etc. When required, insure that the contractor prepares a Training Equipment Progress Report on all trainers and training equipment groups identified in the Training Equipment Package, and submits updating supplements periodically. Insure that training equipment specifications

are provided concurrently with the other configuration item specifications and, when practicable, insure that the training equipment is delivered early enough to be used in system test and evalmation in accordance with AFR 80-14. Schedule and manage Training Equipment Development (TED) so training equipment is installed, calibrated, checked out, and ready for training use no later than the established need date.

(2) Training Facilities. Identify the tentative training facility requirements, i.e., all real estate and buildings to be used exclusively in support to training.

7. Personnel Subsystem Test and Evaluation. Describe the technical implications of this PS element and its interrelationships with the other sections. Identify the following, if possible:

a. Test planning factors.

b. Objectives for accomplishing the test program

c. Test schedules

d. Resources and administration.

e. Participating agencies.

f. PS team representatives.

g. Reporting requirements.

(5) Section 8 - Logistics:

(a) Description. This section is a comprehensive summary of the logistics support to be provided during the Operational Phase, together with the actions to be taken during Validation and the Full Scale Development Phases. It contains logistics concepts, principles, and requirements.

(b) PS Inputs. Describe the planned logistic support of the training equipment package and the biomedical support functions (personnel, equipment, medical logistics, etc.) Specify the AFLC procedures for fulfilling the responsibilities established in AFR 50-19, with respect to training equipment, and in AFR 161-2, with respect to the AFLC requirement for Part II of the QQPRI Report.

(6) Section 9 - Manpower:

(a) Description. This section contains a consolidated and coordinated compilation of manpower requirements to support the system throughout the System Acquisition Life Cycle. It contains assumptions and factors on which requirements are based, projections of requirements by officer and airmen (by grade), and civilian totals

phased by fiscal year throughout the system's anticipated life cycle. This must be done for each participating command. In addition to the manpower requirements, the organizational structure and unit detail listing information will also be included. Section 9 also contains separate entries for manpower requirements for staffing the SPO, including participating command representation; the System Support Manager (SSM) and direct supporting logistic personnel; and the Site Activation Task Force (SATAF), when required. This section is not the basis for the actual manpower allocations by Hq USAF as all commands must use AFM 26-1 in justifying their increased manpower requirements for the system.

(b) PS Inputs. The PS team obtains inputs from AFSC (including the SPO, testing agencies, and supporting divisions), ATC, AFLC, and the using command. As more precise information becomes available, this section progresses from a listing of preliminary manning estimates to a final listing of manpower spaces in support of the acquisition and operation of the system as authorized by Hq USAF on the command Unit Detail Listings (UDLs). Organize this section by command and agency, with each categorized in terms of one or more of the following levels of validity: (1) gross estimates; (2) firm estimates; (3) QQPRI; (4) official manpower request to Hq USAF in accordance with AFM 26-1; or, (5) validated UDL. For manpower estimates, include the specific assumptions and factors on which the estimate was based. Whenever possible, accomplish this by appropriate cross-reference to other sections of the PSPP. Provide schedules and targets for accomplishing each step. Insure that this section shows the total system manpower requirements, time-phased to support the system throughout its entire life cycle. The SPO should insure his PS manning requirements are documented here.

(7) Section 10 - Personnel Training:

(a) Description. This section consists of a comprehensive summary of personnel training to be provided for system testing during the Full Scale Development/Production Phase and to insure efficient human performance during the Deployment Phase. It includes: (1) system trained personnel requirements with emphasis on unique requirements; (2) descriptions, locations, and key dates of each type of training; (3) descriptions of major items of training equipment and the associated aerospace ground equipment (AGE), including the necessary time-phasing; (4) requirements for major new facilities or expansion of existing facilities for training, with appropriate schedules; and, (5) initial and replacement training requirements by fiscal quarters, projected for 10 years, if applicable.

(b) PS Inputs. The System Trained Personnel Requirements (System-TPRs), Training Program, and a synopsis of the Career Field Training Plan constitute the primary inputs into this section.

1. System Trained Personnel Requirements (System-TPRs). System TPR is based upon information submitted by commands having system functional responsibilities. The PS team representatives list the requirements of their respective commands for personnel requiring

system-peculiar training and include the requirements for officers, airmen, and civilians by Air Force Specialty Code, grade, month required, and command. Prepare as much of the System-TPR as possible, based upon the latest and most accurate information on hand. It is evolutionary in nature and cannot be finalized until Hq USAF approves the QQPRI or system manning requirements document.

2. Training Program. This input should give the overall picture of the system's training program. Establish the framework within which the training program will be developed and executed and describe the Air Force guidance provided in the ROC and RAD.

3. Career Field Training Plan Synopsis. This input is the responsibility of ATC, but it is prepared under the cognizance of the PS team. It should summarize the formal Career Field Training Plan which is used by ATC in planning the system-oriented training and should include the training considerations in AFR 161-2. In connection with the latter, ATC plans the medical training needed to give nonmedical students enrolled in technical training courses a working knowledge of system health hazards and protective measures, and develops training manuals and courses of instruction to insure that appropriate information on medical aspects of the system is included. The plan should be prepared in coordination with, and be complementary to, the ORT Plan summarized in Section 5. Include training equipment and facility requirements, and cross-reference other sections as appropriate. Identify specific ATC requirements for the development of the PS elements in support of training, e.g., QQPRI and TEPI Reports.

(8) Section 16 - Biomedical:

(a) Description. This section covers:

1. Special provisions for health promotion, safety, protection, sustenance, escape, survival, and recovery of personnel within the total system complex.

2. Biomedical support requirements, such as, preventive medicine, during system Acquisition Life Cycle.

3. Information on known and potential biomedical problems that should be investigated, together with recommendations for immediate and long range research needed to determine solutions to such problems.

4. Biomedical aspects of personnel selection, including physical examination criteria and procedures.

5. Requirements for diagnostic, therapeutic, and rehabilitation capabilities peculiar to the system.

6. Special requirements for laboratory and medical treatment facilities and medical material.

(b) PS Inputs. For those system programs where biomedical support is not a complex requirement, the PS Manager will prepare the inputs for this section. However, for systems in which biomedical support considerations and problems are of major importance, the SPD should request the Aeorspace Medical Division (AMD) of AFSC to assign an AMD Representative to the PS team. This individual provides the inputs to this section in coordination with the surgeons of the using command and AFLC. Typical inputs include requirements, schedules, and plans for conducting the biomedical aspects of the program, and a description of the interrelationship with the other aspects. Identify the functional relationship between AMD and the PS team and the SPO in Section 3, but cross-reference the applicable paragraphs in this section. Where the biomedical aspects of the system will not require a major effort and no problem areas are anticipated, include a statement to this effect with appropriate justification, in this section.

b. Preliminary Design Reviews (PDRs) Conducted. During the PDRs, the PS team members must insure that the PS requirements in the Part I CIs are properly identified and that each PS requirement is scheduled to be tested or verified by a specific test. Normally, the PS requirements are placed in MIL-STD-490, para 3.3.7, "Human Performance/Engineering" of the Part I specifications.

c. Category I Test Plan Expanded; Procedures Prepared; and Tests Started. The PST&E Plan should be prepared as an integral part of the Category I Test Plan/Procedures to eliminate duplication of effort and reduce cost. The preferred approach is to have the contractor prepare a PST&E Plan or Annex in accordance with a format that is derived from a modification of Data Item Q-122-3. This plan or annex will describe the specific PST&E objectives and procedures and is referenced in or attached to the Category I Test Plan/Procedures. The Category I Plan must describe how PST&E fits into the overall Category I Test picture because the test effort is under the direction control of test personnel and unless PST&E is an integral part of Category I Test planning and procedures, the PST&E Plan will rarely, if ever, be implemented.

d. Critical Design Reviews (CDRs) Conducted. During the CDRs, the PS Manager should assure that a PS team member is always present and an active participant, because, once the Part II CI Specifications are approved at these reviews, they serve as the "build-to" and acceptance testing requirements, and production is started. This means that any PS requirements that are overlooked during the CDRs have very little chance of being placed in the Part II CI Specifications after the CDRs. Any change in the Part II CI Specifications after the CDRs must have a major impact upon the program before it will be accepted as the benefits to be derived must justify the time and cost associated with the change. Thus, a good rule to follow with respect to CDRs is to insure that all PS requirements are properly identified and described in the Part II CI Specifications before the CDRs are conducted.

e. Functional Configuration Audit (FCA) Conducted. During the FCA, the PS Manager should be sure that his team members are present as this is the time when it is verified that the hardware has achieved

performance specified in the Functional/Allocated baseline.

f. Personnel Selected; Training Programs Started; and Procedural Publications Prepared. At this point in time, the personnel who require system training should be selected and made available; the training program should be in its initial stages of implementation; and the preliminary procedural publications should be prepared.

g. Physical Configuration Audit (PCA) Conducted. During PCA, the PS Manager should be sure that his PS team members are present as this is the time when the "as built" configuration of hardware is verified to match the engineering drawing requirements.

h. Category II Test Plan Expanded and Procedures Prepared. The PS actions at this point are basically the same as those discussed earlier for Category I. Refer back to the Category I Test discussion.

3-5. Deployment:

a. Turnover and Transition Agreements Fulfilled. The prime concern of the PS team at this point is to insure the continuation of the PS functions that have to be carried out by the using command, AFLC, ATC, and other participating agencies. This concludes our discussion on the "how" of PS management.

CHAPTER 4

PERSONNEL SUBSYSTEM WORKING GROUP MANAGEMENT

4-1. Introduction. This chapter contains a discussion of the AFSC Personnel Subsystem Working Group, and the panels of which it is composed, as a means of PS Management.

4-2. AFSC Personnel Subsystem Working Group (PSWG):

a. General. The PSWG was established to review, revise, and develop specifications, standards, criteria, and guidance to assist project and program managers in developing their PS programs. The DCS/Systems, Hq AFSC, designates the chairman. AFSC organizations furnish representatives to the panels that comprise the PSWG as directed by Hq AFSC on special orders. The PSWG, through its working panels, plays a major role in determining Air Force PS policies and working with the other services. Elements of the PSWG are:

(1) Steering Committee. This committee which is made up of members from Hq AFSC and the AFSC divisions determines the membership and responsibilities of the working panels.

(2) Personnel Test and Training (PT&T) Panel. The specific responsibilities of this panel are as follows:

(a) Monitor all Air Force and AFSC publications to insure that requirements for PT&T are included where necessary.

(b) Provide direct liaison with Air Training Command and using commands on matters pertaining to PT&T policy.

(c) Provide guidance on PS management and PST&E procedures.

(d) Prepare and update section of AFSC Design Handbook 1-3.

(e) Monitor requirements for PS training programs.

(f) Have general responsibility for all "Q" Data Items and specific responsibility for those items relating to PT&T.

(g) Advise Hq AFSC, DCS/Bioastonautics and Medicine of the specific research needed to support the personnel and training portion of the PS effort.

(h) Work with industrial associations (Aerospace Industries Association, Electronics Industries Association, etc.) as needed, to develop better ways of insuring required PS consideration in system, equipment, and facility development.

(3) Human Engineering (HE) Panel. The specific responsibilities of this panel are as follows:

(a) Monitor all Air Force and AFSC publications to insure that requirements for Human Engineering are included where necessary.

(b) Prepare, review, or revise Air Force and DOD criteria documents (Standards and Specifications) and manuals that pertain to Air Force Human Engineering efforts in system, equipment, and facility development.

(c) Review PS guidance documents and/or prepare such documents to insure needed Human Engineering coverage in system, equipment, and facility development.

(d) Prepare and update parts of AFSC Design Handbook 1-3 that pertain to Human Engineering.

(e) Prepare, review, and revise the "Q" Data Items (reference AFSCM 310-1) that pertain to Human Engineering.

(f) Advise Hq AFSC, DCS/Bioastronautics and Medicine of specific research needed to support the Human Engineering PS effort.

(g) Work with industrial associations (AIA, EIA, NSIA, etc.) as needed to develop coordinated standards and procedures for insuring required Human Engineering considerations in system, equipment and facility development.

(h) Provide inputs to the PT&T Panel on PS management and PST&E matters that pertain to Human Engineering.

(4) Biomedical Panel. The specific responsibilities of this panel are as follows:

(a) Monitor all pertinent Air Force and AFSC publications to insure that requirements for Biomedical Support are included where necessary.

(b) Prepare, review, or revise documents such as manuals, standards, specifications, etc., as necessary to enhance the AFSC medical service support of system, equipment, and facility development in accordance with AFR 161-2, AFR 80-46 and other directives as may be brought to the attention of the panel.

(c) Review PS guidance documents and/or prepare such documents to insure essential Biomedical Support coverage in system, equipment of facility development.

(d) Prepare and update parts of AFSC Design Handbook 1-3 that pertain to Biomedical Support.

(e) Prepare, review, and revise "Q" Data Items that pertain to Biomedical Support.

(f) Advise Hq AFSC, DCS/Bioastronautics and Medicine of specific research needed to support the Biomedical PS support.

b. ESD Support. At ESD, the Technical Requirements and Standards Office (TRT) provides representatives to the PT&T and Human Engineering Panels. Thus, any problems that fall within the jurisdiction of the previously described panels may be presented for resolution. TR, the ESD focal point for PS matters, will forward each project or program office that is concerned with PS a copy of the minutes of the panels. TR will also distribute a PS points-of-contact list that contains the names and phone numbers of PS personnel throughout the Air Force. TR will also supplement the panel minutes with periodic PS managers' meetings.

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REFERENCES

REGULATIONS	TITLE
AFR 80-46	Management of Personnel Subsystem/Human Factors in System, Subsystem, Equipment and Modification Development
AFR 50-9	Special Training
AFR 50-19	Management of Training Equipment
AFR 55-31	Operational Employment Test & Evaluation
AFR 57-1	Policies, Responsibilities, and Procedures for Obtaining New & Improved Operational Capabilities
AFR 57-4	Modification Management of Systems & Equipment
AFR 80-14	Test & Evaluation of Systems, Subsystems, & Equipment
AFR 310-1	Acquisition & Management of Contractor Data
AFSCR 80-3	Development Planning
AFSCR 375-2	Management Techniques Application Plan (MTAP)

MANUALS

AFM 26-1	Policies, Procedures and Criteria
AFM 36-1	Officer Classification Manual
AFSCM 70-5	Work Statement Preparation
AFSCM 310-1 Vol I & II	Management of Contractor Data & Reports
AFSCM 375-4	System Program Management Procedures

STANDARDS

MIL-STD-480	Configuration Control - Engineering Changes, Deviations and Waivers
MIL-STD-481	Configuration Control - Engineering Changes, Deviations and Waivers (Short Form)
MIL-STD-490	Specification Practices
MIL-STD-1472A	Human Engineering Design Criteria for Military Systems, Equipment and Facilities

SPECIFICATIONS/HANDBOOKS	TITLE
MIL-D-26239A	Data, Qualitative & Quantitative Personnel Requirements Information (QQPRI)
MIL-H-46855	Human Engineering Requirements for Military Systems, Equipment & Facilities
AFSC DH 1-3	Personnel Subsystems
AFSC DH 1-6	System Safety

GLOSSARY

A - B

AIR FORCE SPECIALITY (AFS) - A grouping of duties and tasks related in skill, knowledge, difficulty, operational sequence, and the like, and making up a job or specialty. A single individual may have more than one AFS.

AIR FORCE SPECIALTY CODE (AFSC) - A code consisting of a combination of digits, or digits and letters, which is used to identify a given Air Force Specialty (AFS); for example, AFSC 43250, Jet Engine Mechanic, or AFSC 2955, Personnel Subsystem Officer.

BIOMEDICAL SUPPORT - The application of research or technical knowledge to system areas requiring special attention or special provisions for health promotion, safety, protection, sustenance, escape, survival, and recovery for personnel employed in any part of the total system complex.

C

CAREER TRAINING - Courses designed primarily to qualify personnel for advancement within an Air Force Specialty; accomplished by resident courses, on-the-job training, field training, or mobile training courses.

CATEGORY I TESTING - See Subsystem Development Test and Evaluation.

CATEGORY II TESTING - See System Development Test and Evaluation.

CATEGORY III TESTING - See System Operational Test and Evaluation.

CONCEPTUAL PHASE (CONCEPT FORMULATION PHASE) - The period in the system life cycle which extends from the determination of a broad objective to the issuance of the first Systems Management Directive (AFR 80-20).

CONTRACT VALIDATION PHASE (CONTRACT DEFINITION PHASE) - The period in the system life cycle which begins with the issuance of the first Systems Management Directive or Development Directive, at the end of the Concept Phase, and continues until the Full Scale Development Phase.

CONTRACTOR, ASSOCIATE - A commercial firm which has a contract directly with the Government for the development or production of subsystems, equipment, or components meeting the specifications furnished by an integrating contractor and approved by the Air Force.

CONTRACTOR, PRIME - A commercial firm which has a contract directly with the Government and which is held responsible for the overall development or production of an Air Force System or items of equipment.

CONTRACTOR, SUB - A commercial firm whose relationship to the Government is indirect and which contracts with a prime or an associate contractor to assist in fulfilling a prime contract.

COURSE TRAINING STANDARD - A document prepared by the Air Training Command which describes the skills and knowledges to be acquired and the level of proficiency to be attained in a Special Training course, and the recommended skill level for satisfactory performance on the job.

D - E - F

DUTY - A set of operationally related tasks within a given position.

ENGINEERING PSYCHOLOGY - The study of man's behavior in using tools and machines, and of machine design in relation to man's behavioral capacities, abilities, and motivation; the contribution of Psychology to the field of Human Engineering.

FLOW DIAGRAM (FLOW CHART) - A diagram depicting the sequence of operations in the performance of a complex task or series of tasks; includes such funtions as operator performance, the flow of communications and material, and the use of equipment.

FULL-SCALE DEVELOPMENT PHASE - That phase in which the weapon system, including all of the items necessary for its support, is designed, fabricated, and tested.

FUNCTION - The purpose of a thing, either animate or inanimate; also, a purposeful activity; e.g., to sense, filter, measure, compare, process, or store information, or to regulate, control, adjust, or maintain equipment.

FUNCTION ALLOCATION - A process, based on function analysis, of assigning the work to be performed by a system to personnel and equipment so as to achieve maximum effectiveness within the constraints defined by performance, time and cost.

FUNCTION ANALYSIS - The investigation of alternative man and machine capabilities which may be used to satisfy established system requirements; the analytical basis for allocating activities to personnel and equipment so as to achieve optimum system performance.

G - H - I

GOVERNMENT-FURNISHED PROPERTY (GFP) - Items in the possession of, or acquired directly by, the Government, and delivered to or otherwise made available to the contractor.

HUMAN ENGINEERING - The area of human factors which applies scientific knowledge to the design of items to achieve effective man-machine integration and utilization.

HUMAN FACTORS - A body of scientific facts about human characteristics. The term covers all biomedical and psychosocial considerations; it includes, but is not limited to, principles and applications in the areas of human engineering, personnel selection, training, life support, job performance aids, and human performance evalutaion.

HUMAN PERFORMANCE - A measure of man-functions and actions in a specified environment.

INDIVIDUAL TRAINING - The technical training through which personnel learn to perform all the elements of a given job and to understand the interrelationships of the job elements; training which qualifies one in the performance of the individual duties and tasks of a position.

INDIVIDUAL TRAINING PLAN - A document prepared by Air Training Command which sets forth in detail the methods, time-phasing, and requirements necessary for accomplishing individual training in support of a system.

J - K - L

JOB AID - A device, book, or other object designed to assist a worker in performing the duties and tasks of his position with greater accuracy, speed, reliability, or safety.

JOB ANALYSIS - An analysis of a job based upon observation, interviews, and study, so as to determine and identify the duties, tasks, and functions involved, together with the skills, abilities, knowledge, and responsibilities required.

JOB KNOWLEDGE(S) - Specific items of information which must be known or learned in order to perform a particular job; composed of items unique to a given system and general factual information essential to performance of the job.

JOB PROFICIENCY GUIDE (JPG) - A description of an Air Force Specialty (AFS) in terms of the tasks or knowledges which airmen in that specialty are required to perform or have on the job.

M - N - O

MAN-FUNCTION - The function allocated to the human component of a system.

MANNING ESTIMATES - Tables prepared as part of a Qualitative and Quantitative Personnel Requirements Information Report; they present an estimate of the number of personnel required to perform the duties of each type of position per standard working shift under typical working conditions.

MISSION - The objective or task, together with the purpose, which clearly indicates the action to be taken.

MISSION ANALYSIS - The process of analyzing, on a time base, the projected missions which a system will be required to perform; used to identify man and machine functions and to estimate the probable effects of environmental variables and other constraints on the system.

ON-THE-JOB TRAINING (OJT) - A training program of supervised instruction designed to qualify an airman to perform a given AFS while working in a duty assignment of that AFS. (The training is not "on-the-job" training unless the trainee spends a portion of his time in a productive capacity on the job.)

OPERATIONAL READINESS TRAINING (ORT) - The training whereby personnel qualified in the performance of the individual duties and tasks of their positions are further qualified to perform as members of an operational crew.

OPERATIONAL READINESS TRAINING PLAN - A document prepared by a using command which details the courses, requirements, and phasing necessary for accomplishing Operational Readiness Training (ORT) in support of a system. It includes information on planned Crew Training, OJT courses, and other Unit Training which may be required to achieve and maintain operational efficiency. The plan is summarized in the Operations Section of the PSPP/SPP.

P

PERFORMANCE MEASURES - Objective and subjective measures developed to evaluate personnel effectiveness; objective measures include job knowledge tests, job performance samples, proficiency tests, and check lists; subjective techniques include peer ratings, supervisory ratings, and self rating.

PERSONNEL RESOURCES SPECIFICATIONS - The personnel specifications that are designed to delineate the performance and training requirements that must be fulfilled before a system, equipment or facility can be successfully operated and maintained. Part I of the Personnel Resources Specifications (PRSs) contains the individual and team performance requirements and constitutes the Personnel Requirements Baseline. Part II of the PRSs specifies the training that must be accomplished to meet the performance requirements in the Part I PRSs and constitutes the Training Requirements Baseline.

PERSONNEL SUBSYSTEM (PS) - A management concept which considers the functional part of a system which provides, through effective development and implementation of its various elements, the specified human performance necessary in the operation, maintenance, support, and control of the system in a specified environment.

PERSONNEL SUBSYSTEM ELEMENTS - The specific effort and products of system development whose objective is to produce the ultimate human performance required to operate, maintain, and control the system in its operational environment. While details may vary with specific systems, PS elements are normally interdependent and are concurrently developed as a team effort during system acquisition.

PERSONNEL SUBSYSTEM MANAGER - The individual within a program or project office who is responsible for the development of the Personnel Subsystem Program and the activities of the Personnel Subsystem Team members. He serves as the chairman of the PS Team.

PERSONNEL SUBSYSTEM TEAM - A program or project office team that represents each Air Force agency having functional responsibility for a part of the Personnel Subsystem. This team is responsible for assuring that all available technical support and advice is employed in developing and preparing all elements of the Personnel Subsystem for a given program or project.

PERSONNEL SUBSYSTEM TEST AND EVALUATION (PST&E) - That part of system testing which covers human engineering, personnel, training, training equipment, technical publications, and the biomedical aspects of the system. PST&E continues from Category I testing through Category III testing until it has been verified that the system can be operated, maintained, and controlled by the personnel assigned to it.

POSITION - A job, or the aggregate of duties and responsibilities associated with a given assignment; also, location, or to place in a certain location.

POSITION DESCRIPTIONS - A section of a QQPRI Report. It includes the Air Force Specialty (AFS) title; position type title; the general features of the position; job operations, duties, and tasks; aerospace ground equipment used and system equipment operated; time-place-frequency estimates; and task proficiency level.

POSITION SUMMARY - In a QQPRI Report, a brief description of the scope of the responsibilities of an Air Force position, work areas, equipment maintained or operated to the subsystem level, associated workers, team interaction, and the nature of the work performed, including time and place, and the nature of the procedures.

PRIME CONTRACTOR - See Contractor, Prime.

PRODUCTION PHASE - The fourth phase of the system acquisition cycle, during which the weapon system, including training equipment, spares, etc., is provided for operational use.

PROFICIENCY - An individual's level of skill in performing a particular task at any given moment. It is a function of such factors as aptitude, amount of training, and degree of motivation.

PROPOSED SYSTEM PACKAGE PLAN (PSPP) - A document prepared by a SPO at the end of the Contract Validation Phase which defines the system in sufficient detail to permit comparative evaluation of alternative courses of action on the part of higher headquarters and to permit negotiation of contracts for the development portion of the Acquisition Phase. Approval of the PSPP is followed by the issuance of a second System Management Directive.

Q - R

QUALITATIVE AND QUANTITATIVE PERSONNEL REQUIREMENTS INFORMATION (QQPRI) - Development data which identifies qualitatively and quantitatively the Air Force personnel required to operate, maintain, and control Air Force

weapon, support, and command and control systems, and the descriptive position types required for depot level support.

QQPRI REPORT - A development document which provides an early estimate of the personnel required to operate, maintain, and control an Air Force system, and which serves as a basis for further development of manpower, personnel, and training plans and programs.

REQUIREMENTS ACTION DIRECTIVE (RAD) - The document that is prepared at Hq USAF and issued to direct and guide the Air Force actions necessary to translate a required operational capability into an approved and funded program or project that will lead to the procurement of a new or improved system, equipment or facility (AFR 57-1).

RELIABILITY, HUMAN PERFORMANCE - The probability that man will accomplish all required human functions under specified conditions.

REQUEST FOR PROPOSAL (RFP) - The document that outlines to a potential contractor the need for a proposal covering a requirement for equipment, supplies, and/or services.

REQUIRED OPERATIONAL CAPABILITY (ROC) - A research and development guidance document which gives a general description of operational capabilities deemed necessary at a specified time in the future. It outlines the capability desired rather than the means of accomplishment, describing the objectives, operational concept expected, operational environment, and other pertinent factors to be considered (AFR 57-1). Hq USAF considers the following in the preparation of the ROC: national objectives, intelligence estimates, future Air Force tasks as approved by the Chief of Staff, operational needs expressed by major air commands, and technical estimates provided by research and development activities.

SOURCE SELECTION AUTHORITY (SSA) - The individual responsible for insuring the proper conduct of, and making the final selection, in the entire source selection process.

SOURCE SELECTION ADVISORY COUNCIL (SSAC) - The executive staff of the Source Selection Authority. It furnishes assistance, consultation, advice and any other support that the SSA may require (see AFM 70-10).

SOURCE SELECTION EVALUATION BOARD (SSEB) - The body of highly qualified persons who evaluate, narrate and score the proposals received from each offeror. The evaluation report is provided to the SSEB for its analysis (see AFM 70-10).

SPECIAL TRAINING - Formal training to qualify skilled level or supervisory/technician level personnel in maintaining and/or operating new or special equipment, or in new operational techniques and procedures.

STATEMENT OF WORK (SOW) - See Work Statement.

SUBCONTRACTOR - See Contractor, Sub-

SUBSYSTEM - A major functional subassembly or grouping of items or equipment which is essential to operational completeness of a system.

SUBSYSTEM DEVELOPMENT TEST AND EVALUATION (CATEGORY I) - Development testing of the individual components and subsystems of a system. Predominantly a contractor effort in which the Air Force participates and evaluates continuously.

SYSTEM - A composite of equipment, skills, and techniques (including all related facilities, equipment, materiel, services, and personnel) that is capable of performing and/or supporting an operational role.

SYSTEM ANALYSIS - The discovery and identification of sources of error or variability in a system, the measurement of these errors, and the arrangement of elements to improve system performance.

SYSTEM ENGINEERING - The process of applying science and technology to the study and planning of a system so that the relationships of various parts of the system and the utilization of various subsystems are fully established before designs are committed.

SYSTEM DEVELOPMENT TEST AND EVALUATION (CATEGORY II) - Development testing and evaluation of integrated subsystems through the mating process which progresses into a complete system. A joint contractor-Air Force effort during which the Air Force effort becomes predominant with ever-increasing user participation. (AFR 80-14).

SYSTEM EFFECTIVENESS - A measure of the degree to which an item can be expected to achieve a set of specific mission requirements, and which may be expressed as a function of availability, dependability, and capability.

SYSTEM FUNCTION - A discrete action required to achieve a given objective, accomplished through use of equipment, computer programs, personnel, facilities, procedural data, or a combination of these; an operation that must be performed in order to fulfill a system's intended mission.

SYSTEM OPERATIONAL TEST AND EVALUATION (CATEGORY III) - User test and evaluation of operationally configured systems conducted under operational conditions and including all system components, support items, and personnel skills (AFR 80-14).

SYSTEM PACKAGE PROGRAM (SPP) - A detailed documentation of the approved program for acquiring and operating a system (AFR 375-4).

SYSTEM PROGRAM DIRECTOR (SPD) - The head of the System Program Office throughout the Contract Validation, Full Scale Development, and

Production Phases. He manages (plans, organizes, coordinates, controls, and directs) the system-oriented efforts of functional agencies and industries participating in the preparation of a proposed system program or the implementation of an approved system program.

SYSTEM PROGRAM OFFICE (SPO) (AFR 375-3) - The organization established to manage the overall execution of the System Program. It is headed by the System Program Director and is normally located at an AFSC Division or organization, where representatives of the participating organizations involved are physically located during the Contract Validation, Full Scale Development, and Production Phases.

SYSTEM TRAINED PERSONNEL REQUIREMENTS (SYSTEM-TPR) - The number of persons with given abilities needed to meet estimated military requirements. A System TPR document specifies the number of men requiring Career Field Training and/or those requiring Operational Readiness Training, as described in the appropriate Training Plans and the Personnel and Training Section of a PSPP and SPP for a particular system.

T

TASK - A group of related job elements performed within a work cycle and directed toward a goal; a composite of the discriminations, decisions, and motor activities required of an individual in accomplishing a unit of work. A set of operationally similar tasks constitute a duty.

TASK ANALYSIS - An analytical process employed to determine the specific behaviors required of human components in a man-machine system. It involves determining, on a time base, the detailed performance required of man and machine, the nature and extent of their interactions, and the efforts of environmental conditions and malfunctions. Within each task, behavioral steps are isolated in terms of perceptions, decisions, memory storage, and motor outputs required, as well as the errors which may be expected. The data is used to establish equipment design criteria, personnel and training requirements, etc.

TECHNICAL MANUAL - A publication in the Technical Order System which contains instructions designed to meet the needs of personnel engaged or being trained in the operation, maintenance, service, overhaul, installation, and inspection of specific items of equipment and materiel.

TECHNICAL ORDER (TO) - A publication in the Technical Order System which covers standard methods and procedures for operating and maintaining Air Force material.

TECHNICAL PUBLICATIONS - The element of the Personnel Subsystem that is concerned with the timely development of accurate and useful Technical Order documents to support training courses and the initial job performance of system personnel.

TRAINING - The totality of instructions, planned circumstances, and directed activity by which personnel acquire and/or strengthen new concepts, knowledges, skills, habits, or attitudes which will enable them to perform assigned duties with maximum reliability, efficiency, uniformity, safety, and economy.

TRAINING CONCEPT - A broad overall statement which indicates: (1) the objectives of anticipated individual, operational readiness, and other training programs, (2) the facilities which may be required, and (3) the relationship of the anticipated training to existing training programs.

TRAINING EQUIPMENT - Any item or combination of items (exclusive of training aircraft) used for instructional purposes to support the training of personnel, whether or not the item is specifically designed for that purpose. Training Equipment includes: (1) Trainers, (2) Training Accessories, and (3) Training Parts.

TRAINING EQUIPMENT DEVELOPMENT (TED) - That portion of the Personnel Subsystem concerned with the establishment of requirements for, and the procurement of, all equipment needed by using and supporting commands for training purposes. It includes the determination of physical and functional requirements for training equipment, the preparation of performance specifications, and the design, development, fabrication, and testing of approved development items.

TRAINING EQUIPMENT PLANNING INFORMATION (TEPI) - That portion of the Personnel Subsystem which covers the preparation of specific recommendations for training equipment considered necessary to support a given Air Force system.

TRAINING FACILITY - The physical complex in which training is conducted and direct support of training is provided, including: classroom and laboratory area, administrative and study area, direct maintenance and supply support facility, power and environmental control equipment, utilities, and sanitary facilities.

TRAINING PLANS - That element of the Personnel Subsystem which covers the detailed definitions of the methods to be employed and the support required to accomplish all types of training needed for each category of testing, for transitioning personnel to the new system, and for maintaining operational proficiency; based on approved operations, logistics, and maintenance plans, QQPRI, TEPI, and training requirements.

U - V - W

WORK STATEMENT - A contract document issued by the procuring activity which explains in detail what is required of the contractor and serves as a check to ensure compliance with applicable specifications. Also called "Statement of Work" or SOW.

X - Y - Z

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INSTRUCTIONS FOR PREPARING PERSONNEL SUBSYSTEM INPUTS
INTO THE SYSTEM SPECIFICATION (TYPE A MIL-STD-490)

1.0 Paragraph 3.3.7, Human Performance/Human Engineering. Human engineering requirements for the system should be specified herein and applicable documents (e.g., MIL-STD-1472A) included by reference. This paragraph should also specify any special or unique requirements, e.g., constraints on allocation of functions to personnel and communications and personnel/equipment interactions. Included should be those specific areas, stations, or equipment which would require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task, i.e., those areas where the effects of human error would be particularly serious.

2.0 Paragraph 3.6, Personnel and Training.

2.1 Paragraph 3.6.1, Personnel. This paragraph shall specify personnel requirements which must be integrated into system design. Requirements shall be specified in a positive sense, assuming that the numbers and skill levels of personnel will be made available. Requirements stated herein shall be in terms of hard numbers plus tolerance and shall be the basis for contractor design/development decisions. Requirements stated in this paragraph shall be the basis for ultimate complete determination of system personnel training and training equipment/facility requirements. It shall include, but not be limited to: (1) the number and types of operational crew personnel for each deployment mode and the intended duty cycle, both normal and emergency; (2) the numbers and types of maintenance crew personnel for each operational deployment mode and the intended duty cycle, both normal and emergency; and, (3) the types and total number of personnel which may be allocated to the operation, maintenance, and control of the system. It should describe in general qualitative terms, the personnel resources expected to be available for the scheduled training on the system.

2.2 Paragraph 3.6.2, Training. This paragraph shall specify:

a. Contractor and Government responsibility for training requirements that will be generated by new equipment and include the concept of how training should be accomplished, e.g., school, unit, or contractor training.

b. Estimates of quantities of equipment being developed that will be required solely for training purposes.

c. The need to develop associated training devices including types required. Prepare actual detailed statements of requirements for characteristics of training devices. Describe training and skills to be developed by training devices.

d. Training time and locations available for effective training programs.

e. Quantitative requirements for course material and training aids to support the specified training.

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ANNEX NO. 6

PERSONNEL SUBSYSTEM ANNEX
(FULL-SCALE DEVELOPMENT PHASE)

1.0 Purpose. The purpose of this annex is to provide the Contractor with instructions and information for the Personnel Subsystem tasks that are associated with the ___ Segment. The Personnel Subsystem shall provide the human performance necessary to operate, maintain, support, and control the ___ Segment in its operational environment.

2.0 Scope. This annex identifies the Personnel Subsystem task requirements for the Full Scale Development Phase, the technical constraints on these tasks and the relationships with the procuring activity agencies and with other Contractors.

3.0 Task Requirements. The Contractor shall provide the materials and services required to conduct, develop and support an integrated Personnel Subsystem Program for the ___ Segment. The Contractor shall integrate the Personnel Subsystem considerations into the System Engineering and design efforts of the Full Scale Development Phase.

3.1 Narrative Description and Special Instructions:

3.1.1 Personnel Subsystem Development Plan (PSDP). The contractor shall develop a Full Scale Development Phase (PSDP) that is based upon the preliminary PSDP that was prepared during the Validation Phase and subsequently modified by the procuring activity. The Full Scale Development Phase (PSDP) shall be limited to Human Engineering, Biomedical Support, Training, Personnel Planning Information and Personnel Subsystem Test and Evaluation (DATA Item Q-101-1).

3.1.2 Human Engineering. As a part of the Full Scale Development Phase System Engineering and design efforts, the Contractor shall tailor the procedures in MIL-H-46855 and the Human Engineering design criteria in MIL-STD-1472A to the ___ Segment requirements. The contractor's primary Human Engineering efforts shall consist of: (1) integrating Human Engineering criteria into the design of new equipment, selection of equipment, and definition of facilities requirements; (2) evaluating commercial equipment to determine how they deviate from MIL-STD-1472A; (3) active participation by qualified Human Factors Personnel in all design reviews (Preliminary Design Reviews, Critical Design Reviews, etc.);and, (4) consideration of man-computer interactions during the design of the software. Attention shall be focused upon critical task analysis, sharing of controls and displays, workload and analysis, operation and maintenance procedures, etc. When requested by the procuring activity, the Contractor shall provide Human Engineering data to the Integrating Contractor.

3.1.3 Biomedical Support. Prior to the Preliminary Design Reviews (PDRs), the contractor shall identify all biomedical problems (e.g., CRT radiation, RF radiation, high noise levels, etc.) and describe the manner in which they will be controlled, reduced, or eliminated. The Part I and Part II CI and other applicable specifications shall reflect

the appropriate corrective action. This task is a continuation of the biomedical support design effort that was initiated during the Validation Phase. (Data Item Q-110-1).

3.1.4 Personnel Planning Information (PPI). The Contractor shall inform the procuring activity Personnel Subsystem Manager of any design changes that will affect the manning, training or procedural data associated with the ___ Segment. PPI shall be readily accessible to the procuring activity for review.

3.1.4.1 Qualitative and Quantitative Personnel Requirements Information (QQPRI). There is no requirement for the contractor to prepare a QQPRI Report during the Full Scale Development Phase. The procuring activity shall provide Air Training Command with the system trained personnel requirements for the Air Force. ATC will provide system training to contractor personnel when required.

3.1.5 System Training:

3.1.5.1 System Training Concept. ATC will develop a system training program to qualify Air Force personnel to perform operation and maintenance tasks required by all elements of Program ___. The training program will be described in an Individual Training Plan which will be prepared, published, and distributed by ATC. The plan will include the System Trained Personnel Requirements (System-TPR) course identification and description, training and class schedules, manpower, personnel, and funding data. When approved by all affected agencies, the plan will identify the training methods, levels of training, and schedules that will support the system training program. ATC will publish and distribute revisions to the plan in a timely manner as required.

3.1.5.2 Contractor Training Support:

3.1.5.2.1 Data and Services. Eighteen months prior to system acceptance and continuing to termination of the contract, the contractor shall provide the data and services specified below to support ATC instructors in preparing courses for the instruction of Air Force personnel.

a. Access to all departments affected by the ___ Segment contract.

b. Access to technical data engineering drawings, specifications, technical procedures, operator and maintenance procedures, data flow, photographs, and schematics developed under the ___ Segment contract or obtained from subcontractors.

c. 900 hours of clerical assistance to include typing and reproduction.

d. 75,000 standard page units of direct reproduction by the most economical means, black on white, of student study guides and handouts prepared from available publications or data, or prepared by ATC instructor personnel.

e. Direct reproduction of 2,000 single sheet viewgraph transparencies from existing contractor formats or ATC drawings.

f. Classrooms, office space and facilities as listed below:

(1) Five classrooms of 400 square feet each; each equipped with tables and chairs for 18 students, a blackboard, a viewgraph projector, and a screen, 6 months prior to system acceptance and for one year thereafter.

(2) Two offices with two desks and chairs each; each office with one four-drawer security container and two four-drawer filing cabinets; both offices will be required for one year commencing at Critical Design Review.

g. Non-Personnel Services for:

(1) One ATC instructor on assignment to the Contractor's facility for the period of the performance of the ___ Segment contract.

(2) Additional ATC instructors not to exceed 12 or an average of 8 at any given time.

h. During the period of instructor residency, the contractor shall provide 640 manhours of consultation time for ATC instructors to consult with contractor personnel (designers, engineers, training specialists and technicians) to obtain information and select data to support the training program being developed by ATC.

i. Selection of applicable data and documents during ATC consultation with Contractor (Associate Contractor, Subcontractor, and Vendor) personnel. The contractor shall release selected data to ATC as required to fulfill Data Item Q-108-1/M.

3.1.5.2.3 Other Requirements. Other requirements include the following:

a. The contractor shall make available, use of the system equipment for training preparation and training presentation purposes, the dates and times of use and the specific quantities of on-equipment times will be agreed to and directed by the procuring activity to support the coordinated System Training Plan.

b. The contractor shall permit, on a non-interference basis, observation of component and system testing conducted at the contractor's facilities.

c. The contractor shall permit observation of the installation and checkout of the system equipment on a non-interference basis.

3.1.6 Personnel Subsystem Test and Evaluation (PST&E). The contractor shall develop a PST&E Plan that is integrated and coordinated with the ___ Segment Category I and II Test Plan. The PST&E Plan shall also interface with and support the PST&E Plan that is developed with the Integrating Contractor.

3.2 Technical Specifications/Standards, Administrative Directives. The following documents of the exact issue shown, or part thereof as further described, form a part of this annex:

MIL-H-46855	Human Engineering Requirements for Military Systems, Equipment and Facilities
MIL-STD-1472A	Human Engineering Design Criteria for Military Systems, Equipment and Facilities
MIL-STD-490	Specification Practices
AFSCM 310-1/ AFLCM 310-1	Management of Contractor Data and Reports
AFSCM 310-2	Technical Publications Acquisition Manual
ATCM 50-9	Guide for Special Training

3.3 Administrative and Reference Documents. The following documents are to be considered as reference material for the purpose of interpreting the requirements of this annex but do not form a part of it:

AFSC Design Handbook, Series 1-0, Personnel Subsystems, DH 1-3	
AFSC Design Handbook, Series 1-0, System Safety, DH 1-6	
AFR 80-46	Management of Personnel Subsystem/Human Factors in System, Subsystem, Equipment and Modification Development
AFR 50-9	Special Training

3.4 Relationship to System Engineering. Personnel Subsystems, as an integral activity of the System Engineering Process (SEP), shall utilize SEP documentation in defining and optimizing the Personnel Subsystems aspects of the system design as a total system basis. It is intended that the System Engineering Process include the development of definitive training requirements, for both personnel and equipment.

CONTRACT DATA REQUIREMENTS LIST

ATCH NR _____ TO EXHIBIT _____ CATEGORY _____ SYSTEM/ITEM _____

TO CONTRACT/PR _____ CONTRACTOR _____

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16. REMARKS					
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4.	5.	7. 8. 9.	11.	13.	15. TOTAL
16. REMARKS					
1.	2. 3.	6.	10.	12.	14.
4.	5.	7. 8. 9.	11.	13.	15. TOTAL
16. REMARKS					
1.	2. 3.	6.	10.	12.	14.
4.	5.	7. 8. 9.	11.	13.	15. TOTAL
16. REMARKS					
1.	2. 3.	6.	10.	12.	14.
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13. ABSTRACT

Personnel Subsystem Management within the Electronic Systems Division is presented. Presentation includes a description of the functional areas of the Personnel Subsystem, and those events which lead to an effective personnel subsystem within the system acquisition process. The Personnel Subsystem requirements for each phase of the system acquisition life cycle are presented as an integral part of the system management process.

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