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HUMAN RESOURCES

ADVANCED ON-THE-JOB TRAINING SYSTEM:
PRIME ITEM SPECIFICATION
FOR THE EVALUATION SUBSYSTEM

Douglas Aircraft Company
A Division of McDonnell Douglas Corporation
2450 South Peoria
Aurora, Colorado 80014

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TRAINING SYSTEMS DIVISION
Brooks Air Force Base, Texas 78235-5601

May 1990

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LABORATORY

**AIR FORCE SYSTEMS COMMAND
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This paper has been reviewed and is approved for publication.

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13. ABSTRACT (Maximum 200 words) The Prime Item Specification establishes the performance, design, development, and test requirements for the Evaluation Subsystem. It was prepared using MIL-STD-490A Specification Practices as a guide. The evaluation specification provides the support necessary to develop and deliver evaluation instruments as required to achieve task proficiency for progress of individual airmen toward training quality control and supports the evaluation of the Advanced On-the-job Training System (AOTS). <i>Keywords:</i>				
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PRIME ITEM SPECIFICATION
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Reviewed and submitted for publication by

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This publication is primarily a working paper. It is published solely to document work performed.

SUMMARY

The Advanced On-the-job Training System (AOTS) was an Air Staff directed, AFHRL developed, prototype system which designed, developed, and tested a proof-of-concept prototype AOTS within the operational environment of selected work centers at Bergstrom AFB, Texas, and Ellington ANGB, Texas, from August 1985 through 31 July 1989. The AOTS Prime Item Specification for the Evaluation Subsystem establishes the performance, design, development, and test requirements for the Evaluation Subsystem. It was prepared using MIL-STD-490A, Specification Practices, as a guide. The Evaluation Specification provides the support necessary to develop and deliver evaluation instruments as required to achieve task proficiency for progress of individual airmen toward training quality control and supports the evaluation of the AOTS.

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PREFACE

This paper was developed by Douglas Aircraft Company, the AOTS development contractor, under Government Contract Number F33615-C-84-0059. The AFHRL Work Unit Number for the project is 2557-00-02. The primary office of responsibility for management of the work unit is the Air Force Human Resources Laboratory, Training Systems Division, and the Air Force AOTS manager is Major Jack Blackhurst.

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1. SCOPE

1.1 General. This specification establishes the performance, design, development, and test requirements for the Evaluation Subsystem prime item of the Advanced On-the-Job Training System (AOTS). It has been prepared using MIL-STD-490A, Specification Practices, as a guide. The Evaluation Subsystem of the Advanced On-the-Job Training System (AOTS) provides the support necessary to develop and deliver evaluation instruments as required to achieve task proficiency for individual airman progress toward duty position qualification. It also provides the application of training quality control and supports the evaluation of the AOTS System.

1.2 Automated support. The AOTS Evaluation Computer Program Configuration Item (CPCI) Development specification (70S647413) provides a description of automated support for the Evaluation Subsystem. Support will be provided for identifying and maintaining evaluation requirements for Air Force Specialties (AFSS); delivering evaluation requirements; applying training quality control; and evaluating the AOTS System.

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2. APPLICABLE DOCUMENTS

2.1 Government documents. The following government documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of the specification shall be considered a superseding requirement.

SPECIFICATIONS:

70S647100	Prime Item Development Specification for Management Subsystem
70S647200	Prime Item Development Specification for Training Development and Delivery Subsystem
70S647400	Prime Item Development Specification for Computer Support Subsystem
70S647500	Prime Item Development Specification for Personnel and Support Subsystem

STANDARDS:

MIL-Q-9858A 7 Aug 1981	Quality Program Requirements
MIL-S-52779D 22 Oct 1983	Software Quality Assurance Program Requirements
MIL-STD-470A 3 Jan 1983	Maintainability Program for Systems and Equipment
MIL-STD-480A 12 Apr 1978	Configuration Control - Engineering Changes, Deviations, and Waivers
MIL-STD-483A 4 Jun 1985	Configuration Management Practices for Systems, Equipment, Munitions and Computer Programs
MIL-STD-490A 4 June 1985	Specification Practices

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MIL-STD-499A
1 May 1974

Engineering Management

MIL-STD-785B
15 Sep 1980

Reliability Program for Systems and
Equipment Development and Production

MIL-STD-882A
1 Apr 1974

System Safety Program for Systems and
Associated Subsystems and Equipment

MIL-STD-1472C
1 Sep 83

Human Engineering Design Criteria for
Military Systems, Equipment, and
Facilities

MIL-STD-1521A
21 Dec 81

Technical Reviews and Audits for
Systems, Equipment and Computer
Programs

OTHER PUBLICATIONS:

AFR 12-35
3 Jun 85

Air Force Privacy Act Program (PA)

AFR 35-8
25 Apr 83

Air Force Military Personnel Testing
System

AFR 35-41
26 Apr 85

Reserve Personnel Policies and
Procedures - Reserve Training (Vol 2)

AFR 50-8
6 Aug 84

Policy and Guidance for Instructional
System Development (ISD)

AFR 50-23
Jun 87

On-The-Job Training (PA)

AFP 50-58
15 Jul 78

Handbook for Designers of Instructional
Systems (Vols 1-6)

AFM 50-62
15 Jan 84

Principles and Techniques of Instruction

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2.2 Non-Government documents. The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of the specification shall be considered a superseding requirement.

OTHER PUBLICATIONS:

Structured Systems Analysis: Tools and Techniques, October 1977; Gane, Chris and Sarson, Trish.

3. REQUIREMENTS

3.1 Prime item definition. This specification establishes the requirements for the Evaluation Subsystem for the Advanced On-the-job Training System (AOTS). The Evaluation Subsystem shall provide a computer-based development and implementation process, within which evaluation materials and procedures can be developed. The Evaluation Subsystem shall provide capabilities for the development of behavioral objectives and the development and use of evaluation materials to assess task proficiency and knowledge of trainees. The Evaluation Subsystem shall manually collect and analyze data that are related to the effectiveness and cost of job-site training and evaluation development.

The Evaluation Subsystem shall present, score and analyze tests used for task knowledge/performance evaluations and Quality Control evaluations. It shall collect task performance evaluation data, and generate all system evaluation reports. The subsystem shall consist of the following four components:

- a. Evaluation Instrument Management
- b. Performance Evaluation
- c. Training Quality Control
- d. System Evaluation.

3.1.1 Prime item diagram. This section incorporates the prime item level functional schematics. The section shows top-level functional flow diagrams of the configuration item and includes functional flow diagrams to the level required to identify all essential functions. Lower level diagrams giving further definition and depth to the operation of the Evaluation Subsystem are presented in Section 10 (Appendix I). Data dictionaries defining processes, data flows, and data stores are presented in Section 20 (Appendix II). Figure 1 shows the relationship between the Evaluation Subsystem and the other AOTS subsystems. Figure 2 presents the four components that make up the AOTS Evaluation Subsystem.

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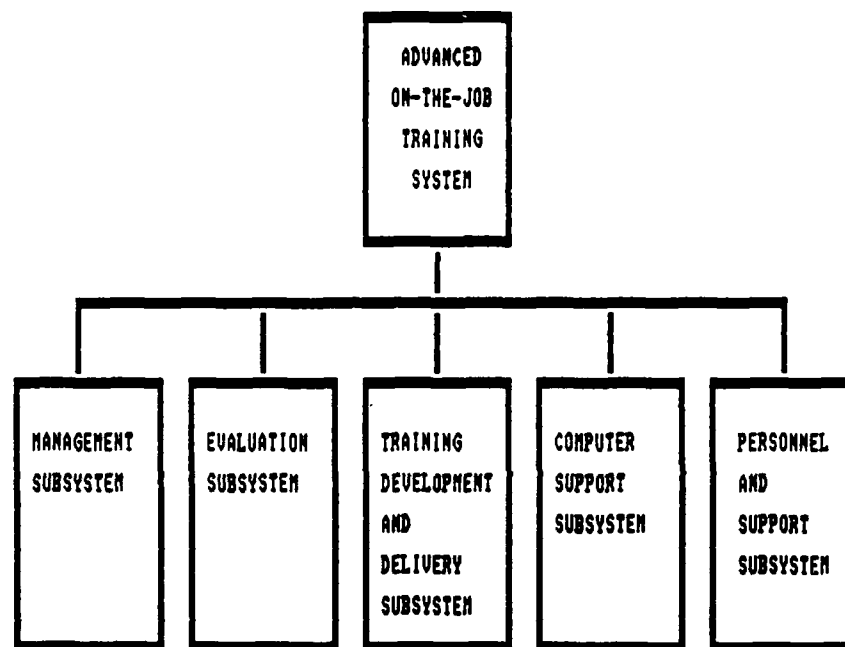


Figure 1. AOTS Visual Table of Contents

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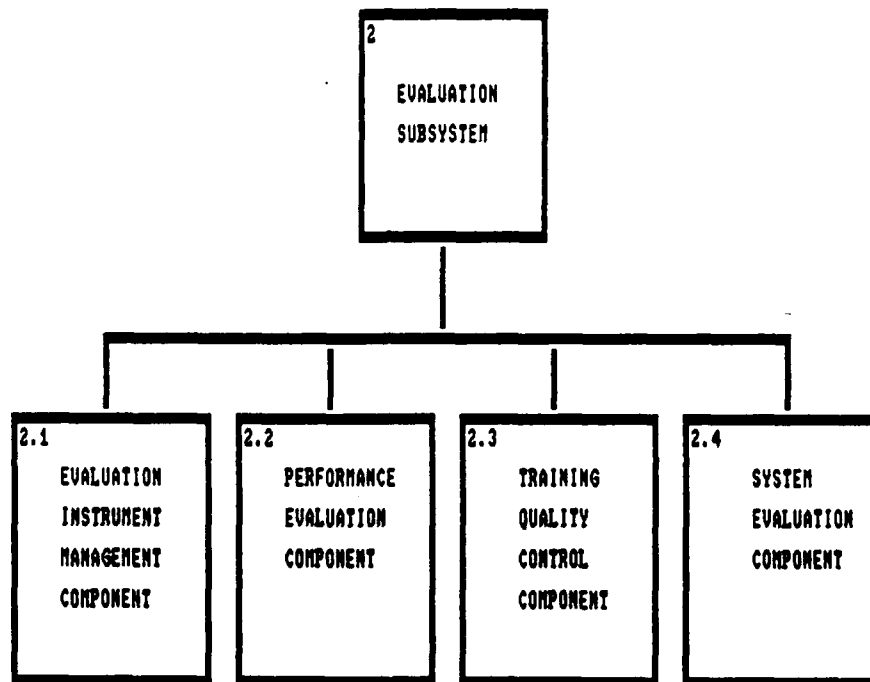


Figure 2. Evaluation Subsystem Overview

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3.1.1.1 Evaluation Instrument Management Component overview.
Figure 3 shows the three primary processes included in the
Evaluation Instrument Management Component.

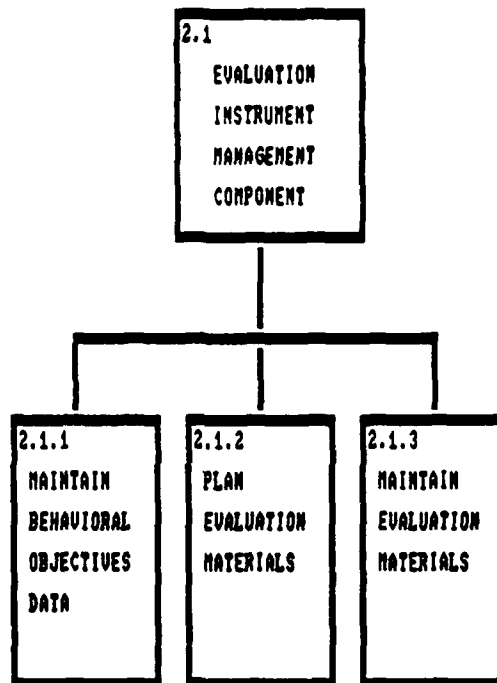


Figure 3. Evaluation Instrument Management Component Overview

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3.1.1.2 Performance Evaluation Component overview. Figure 4 shows the four primary processes included in the Performance Evaluation Component.

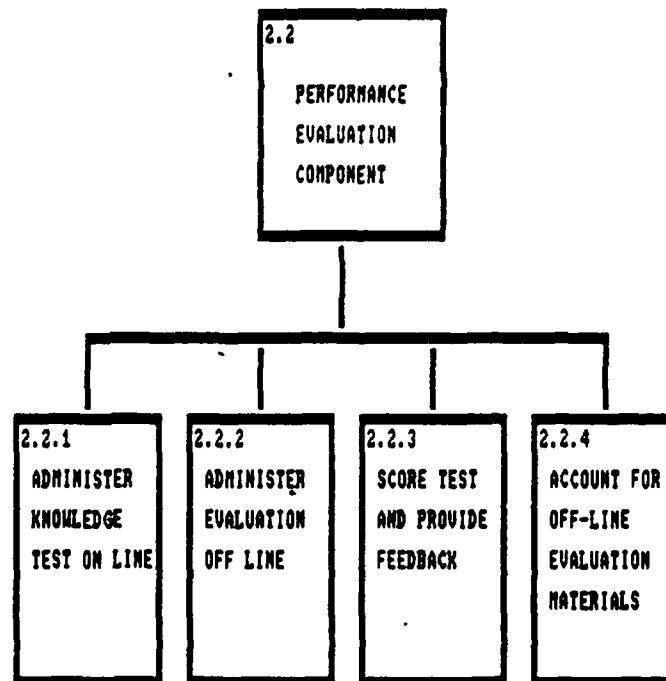


Figure 4. Performance Evaluation Component Overview

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3.1.1.3 Training Quality Control Component overview. Figure 5 shows the two primary processes included in the Training Quality Control Component.

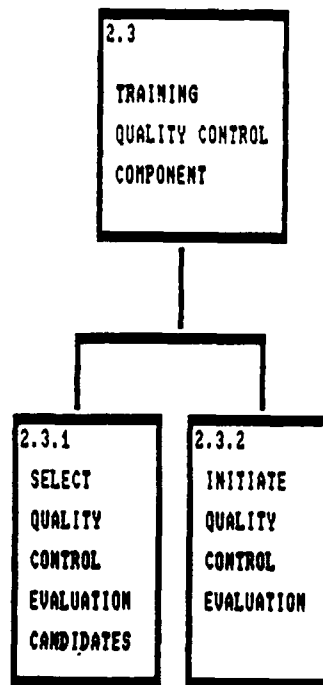


Figure 5. Training Quality Control Component Overview

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3.1.1.4 System Evaluation Component overview. Figure 6 shows the three primary processes included in the System Evaluation Component.

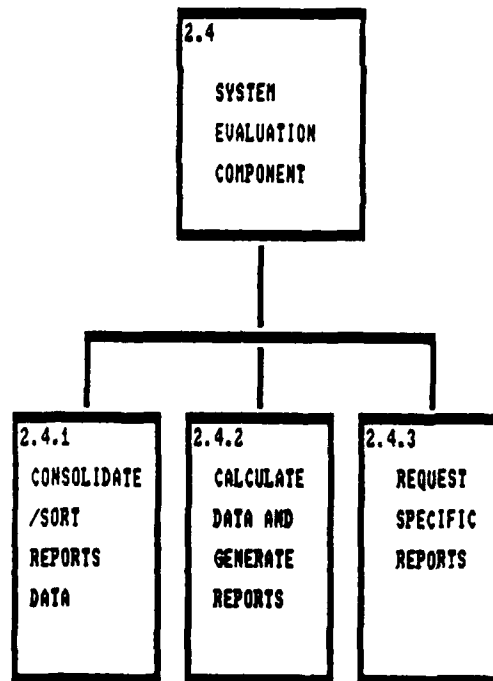


Figure 6. System Evaluation Component Overview

3.1.2 Interface definition. The Evaluation Subsystem establishes functional interfaces within and outside of the AOTS, as depicted by Figure 7. The Evaluation Subsystem maintains interfaces with components of other AOTS subsystems and with internal components of the Evaluation Subsystem. Section 10 (Appendix I) depicts the functional interfaces: (a) among the Evaluation Subsystem and the other subsystems and (b) within the Evaluation Subsystem components. Each interface is discussed separately.

3.1.2.1 Interfaces within AOTS. The Evaluation Subsystem interfaces with the following AOTS subsystems:

- a. Management
- b. Computer Support
- c. Personnel and Support
- d. Training Development and Delivery.

3.1.2.1.1 Management Subsystem interface. The Evaluation Subsystem interfaces with the Management Subsystem as described below:

3.1.2.1.1.1 The Evaluation Subsystem shall provide the Management Subsystem with the following:

- a. Data which identify behavioral objectives, tests and test items that apply to job-site tasks
- b. Data which identify training and evaluator resources required for job-site tasks
- c. Data which identify references that apply to behavioral objectives and test items
- d. Results of knowledge and performance evaluations accomplished for pre-training, post-training and Quality Control (QC) purposes
- e. Data which identify tasks, evaluators and evaluatees which have been selected for Quality Control (QC) evaluations.

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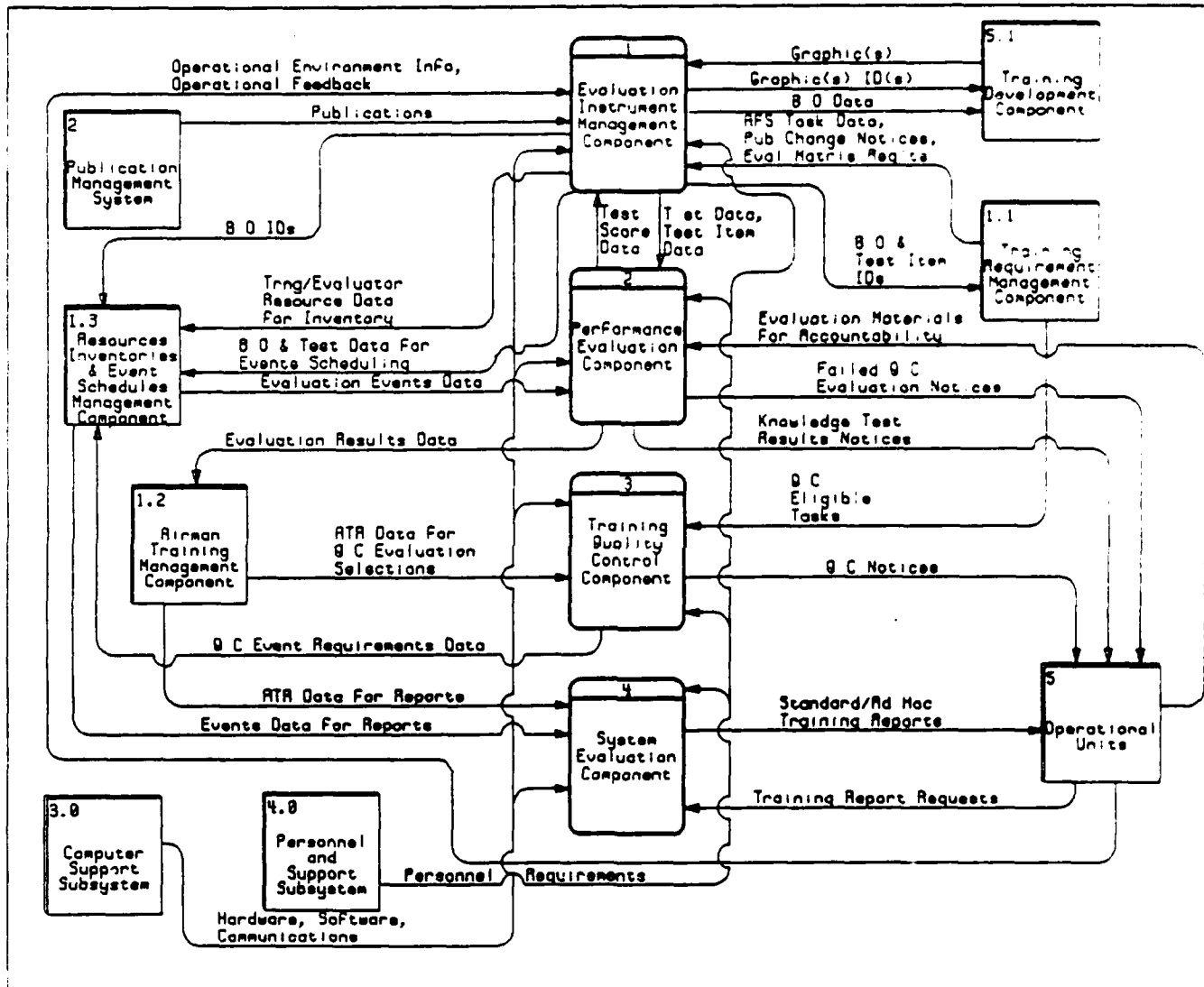


Figure 7. Evaluation Subsystem Interface Overview

3.1.2.1.1.2 The Management Subsystem shall provide the Evaluation Subsystem with the following:

- a. Task analysis data for job-site tasks
- b. Training management data for individuals operating under the AOTS
- c. Evaluation events data for individuals and groups
- d. Task and individual qualification factors for quality control processing
- e. Training management and evaluation events data needed to evaluate system effectiveness.

3.1.2.1.2 Computer Support Subsystem interface. The Computer Support Subsystem shall provide the hardware, software and communications necessary to support the Evaluation Subsystem.

3.1.2.1.3 Personnel and Support Subsystem interface. The Personnel and Support Subsystem shall identify personnel skill and training requirements and provide for on-the-job training required to accomplish the Evaluation Subsystem functions. The Personnel and Support Subsystems shall also provide maintenance and logistics support, human engineering and reliability for effective implementation and operation of the Evaluation Subsystem. The Evaluation Subsystem functional requirements shall be used to help determine the personnel skill and training requirements for the Personnel and Support Subsystem.

3.1.2.1.4 Training Development and Delivery Subsystem interface. The Evaluation Subsystem interfaces with the Training Development and Delivery Subsystem as described below:

3.1.2.1.4.1 The Evaluation Subsystem shall provide the Training Development and Delivery Subsystem with behavioral objectives data for the purpose of developing training materials.

3.1.2.1.4.2. The Training Development and Delivery Subsystem shall provide the Evaluation Subsystem with graphics for developing test items and administering on line tests.

3.1.2.2 Interfaces with sources external to AOTS. The Evaluation Subsystem interfaces with external sources as described below:

3.1.2.2.1 Publications Management interface. An interface will

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be established between the prototype AOTS and publication management activities to ensure those references containing pertinent task data, and consequently used in the planning and development of behavioral objectives and evaluation materials, are available and maintained on a current basis. An Air Force Customer Account Representative (CAR) will interface with the Publications Distribution Office (PDO) at Bergstrom AFB, Texas for ordering and receiving Air Force and applicable major command publications. An Air Force representative shall also interface with the Technical Order Distribution Office (TODO) at Bergstrom. It is anticipated that access to the Automated Technical Order Maintenance System (ATOMS) will be required for evaluation instrument developers when AOTS becomes operational in the Air Force. Accordingly, if the ATOMS is implemented at Bergstrom AFB during the development of the prototype AOTS, the establishment of an interface will be considered at that time.

3.1.2.2.2. Operational Unit interface. The Evaluation Subsystem shall interface with the operational units. The Evaluation Subsystem shall provide the operational units with evaluation instruments both on line and off line, test results, and system effectiveness reports. The operational units will provide operational conditions, factors and feedback pertaining to the planning, development and use of evaluation methods and materials which derive from processes within the Evaluation Subsystem.

3.1.2.3 Evaluation Subsystem Component interface. The Evaluation Subsystem Components interface with each other as described below:

3.1.2.3.1 Evaluation Instrument Management Component interface. The Evaluation Instrument Management Component shall provide the Performance Evaluation Component with developed tests and test items for the purpose of administering and scoring evaluations.

3.1.2.3.2 Performance Evaluation Component interface. The Performance Evaluation Component shall provide test scoring results to the Evaluation Instrument Management Component for the purpose of analyzing and validating evaluation materials. The Performance Evaluation Component shall support the administration and scoring of quality control evaluations for the Training Quality Control Component.

3.1.2.3.3 Training Quality Control Component interface. The Training Quality Control Component shall identify qualified tasks, evaluatees and evaluators for quality control evaluation events supported by the Performance Evaluation Component.

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3.1.3 Major component list. As mentioned in 3.1, the Evaluation Subsystem shall consist of the following components:

- a. Evaluation Instrument Management Component
- b. Performance Evaluation Component
- c. Training Quality Control Component
- d. System Evaluation Component.

3.1.4 Government furnished property list. The Instructional Support System (ISS) will be furnished by the government. Where applicable, it will be modified to meet requirements of the Evaluation Subsystem.

3.1.5 Government loaned property list. This section is not applicable to this specification.

3.2 Characteristics.

3.2.1 Performance. The Evaluation Subsystem shall provide the evaluation procedures and controls used to effectively support the implementation and operation of the prototype AOTS. The Evaluation Subsystem shall be compatible with and supportive of the other subsystems in accordance with Specification Documents 70S647100, 70S647200, 70S647400, and 70S647500. The subsystem shall be user-friendly and supportive of multiple ability levels. This subsystem shall be responsive to requirements and demands imposed by the other AOTS subsystems and shall be incrementally developed to be consistent with the phased build-up of the AOTS. MIL-H-46855A, MIL-Q-9858A, MIL-S-52779D, MIL-STD-470A, MIL-STD-480A, MIL-STD-490A, MIL-STD-499A, MIL-STD-785B, MIL-STD-882A, MIL-STD-1472C, and MIL-STD-1521A may be used as guides for the development, testing and implementation of the AOTS Evaluation Subsystem design. Design deficiencies revealed during formative evaluation shall be corrected prior to installation of the next component. Specific training to be given to system users and managers shall be determined by the Personnel and Support Subsystem.

3.2.2 Physical characteristics. This section is not applicable to this specification.

3.2.3 Reliability. The evaluation instrument development tools, evaluation instrument analyses, and system reports that exist as functional requirements of the Evaluation Subsystem shall be the basis for determining required reliability methodology. Valid

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and reliable methods and mechanisms shall be provided for producing, and managing the delivery of all evaluation instruments and devices necessary to support individual task certification for all airmen assigned to designated AOTS work centers throughout the period of the contract. Such methods will include statistical tests of significance of correlations based on test/retest if resources permit, inter-item correlation (i.e., internal consistency), and intra-class correlations of agreement. Statistical measures of reliability shall be provided for all evaluative instrumentation. Report reliability shall test for the consistency of input and output data. The reliability of instruments and reports will ensure quality assurance of system effectiveness.

3.2.4 Maintainability. System report generation that exists as a functional requirement of the Evaluation Subsystem will provide the capability to maintain the prototype AOTS at an effective level. Air Force personnel shall be trained in the correct application of data analyses, report generation, and use of results in the maintenance of the prototype AOTS. Specific details are contained in the AOTS Maintainability Plan.

3.2.5 Environmental conditions. This section is not applicable to this specification.

3.2.6 Transportability. This section is not applicable to this specification.

3.3 Design and construction.

3.3.1 Materials, processes, and parts. This section is not applicable to this specification.

3.3.2 Electromagnetic radiation. This section is not applicable to this specification.

3.3.3 Nameplates and product markings. This section is not applicable to this specification.

3.3.4 Workmanship. This section is not applicable to this specification.

3.3.5 Interchangeability. This section is not applicable to this specification.

3.3.6 Safety. This section is not applicable to this specification.

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3.3.7 Human performance/human engineering. Good human factors engineering practices shall be applied to the Evaluation Subsystem, to ensure optimal man-machine interface. User-friendly menus, prompts, and feedbacks shall be employed to ensure that users/operators will adequately understand the utility of development and analytical tools, the interface of evaluation instruments with system components, and the application of generated reports. The Evaluation Subsystem shall be developed in accordance with MIL-H-46855A.

3.4 Documentation. This section is not applicable to this specification.

3.5 Logistics.

3.5.1 Maintenance. The reports that exist as a functional requirement of the Evaluation Subsystem shall form the basis for subsystem maintenance. The reports shall contain instrument analyses and data concerning the use of authoring aids, and development time. Air Force personnel shall be trained in the application of analyses and test results to effect necessary subsystem and data updates. Application of analytical results shall assure that system effectiveness is maintained. By correctly applying response results, the system development tools, evaluation instruments, and the reports themselves can be updated and kept dynamic in response to trainee/supervisor, environmental, hardware/resources, software, and system administrative policies/personnel changes.

3.5.2 Supply. This section is not applicable to this specification.

3.5.3 Facilities and facility equipment. Design and construction of real property facilities will be accomplished by the government.

3.6 Personnel and training.

3.6.1 Personnel. This section is not applicable to this specification.

3.6.2 Training. This section is not applicable to this specification.

3.7 Major component characteristics. The Evaluation Subsystem shall be capable of providing assessment of trainee task proficiency and task requisite knowledge. The system shall collect and analyze data related to the training efficiency and cost

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effectiveness of AOTS job site training. The component characteristics are specified below and elaborated in Appendix I and Appendix II. Processes performed, procedures followed and products produced shall be in accordance with AFR 12-35, AFR 35-8, AFR 35-41, AFR 50-8, AFR 50-23, AFP 50-58, and AFM 50-62.

3.7.1 Evaluation Instrument Management Component requirements. The Evaluation Instrument Management Component shall provide valid and reliable methodologies and mechanisms for producing, maintaining, and managing the evaluation instruments and devices that support individual job-site task performance evaluation and task certification. The primary processes required to accomplish the functions of the Evaluation Instrument Management Component include:

- a. Maintain Behavioral Objectives Data
- b. Plan Evaluation Materials
- c. Maintain Evaluation Materials.

3.7.1.1 Maintain behavioral objectives data. The system shall provide the capability to select any task for behavioral objective development or revision. Up to six behavioral objectives may be developed for each task and subtask. Each behavioral objective statement shall consist of:

- a. An explicitly stated behavior
- b. The operational conditions and parameters
- c. The standards or criteria used to demonstrate trainee mastery.

3.7.1.2 Plan evaluation materials. Manual or automated tools and methodologies shall be available to analyze task performance and proficiency data, to specify evaluation strategies, and to determine task performance evaluation resource requirements. Procedures and mechanisms provided by the contractor shall be capable of producing operational products that reflect Air Force Instructional System Development (ISD) policy.

3.7.1.2.1 Review/analyze task information. The system shall provide the capability to examine available performance and proficiency data and consider operational information to develop initial estimates of evaluation parameters. Estimates shall be derived from primarily manual means which allow evaluation materials planner to:

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- a. Identify task skill and knowledge requirements
- b. Identify task performance literacy requirements
- c. Identify influencing environmental conditions
- d. Estimate task performance variance across work centers
- e. Establish probability of change within work centers.

3.7.1.2.2 Determine evaluation strategies & resource requirements . Evaluation materials developers shall manually select and rank evaluation strategies. Selections and ranking decisions shall be based on estimates of evaluation parameters, resource requirements versus resource availability, relative cost of strategies, and task priority. Developers will manually:

- a. Select candidate strategies
- b. Establish candidate's resource requirements
- c. Compare resource requirements to availability
- d. Determine resource deficiencies
- e. Rank strategies
- f. Accept or override ranking of strategies
- g. Establish resource requirements.

The strategies shall support the direct observation of airmen task performance for certification. In instances where direct observation of a task is difficult because it is rarely performed in the operational environment, but the task is critical in nature, alternates to direct observation will be specified. Determining resource and logistics requirements is part of determining evaluation strategies. Adequate strategies with low resource requirements shall be given priority. The system shall have the capability to incorporate new evaluation strategies that may become available during the contract period. New evaluation strategies shall be studied, and recommendations for incorporation into the Evaluation Subsystem shall be made, based on pre-planned product improvements.

3.7.1.3 Maintain Evaluation Materials. Processes used to maintain the evaluation material shall enable the development of in-

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dividual test items and tests for terminal and supporting objectives. The system shall allow the capability to develop oral test guides, performance evaluation checklists, and knowledge items (i.e., multiple choice, list multiple choice, true/false, matching, touch, sequential touch, and constructed response test items).

Processes used to maintain the evaluation materials shall allow developers to:

- a. Reference test items to one or more behavioral objectives
- b. Reference test items to one or more publications
- c. Develop/revise oral test guides (OTGs)
- d. Develop/revise performance evaluation checklists (PECs)
- e. Develop/revise knowledge test items (e.g. true/false multiple choice, matching, constructed response, touch)
- f. Incorporate graphics in knowledge test item stems
- g. Select test items for tests
- h. Cross-reference (code) items to tests
- i. Specify test formats
- j. Specify test parameters
- k. Specify test instructions
- l. Develop a primary and at least two alternate knowledge tests for each objective
- m. Select alternate tests at random for presentation after a trainee has failed the primary test
- n. Analyze evaluation materials
- o. Validate evaluation materials.

3.7.1.3.1 Maintain Test Item Bank. The test items shall be stored in a Test Item Bank data store. The criterion for initial acceptability of a test item shall be that there is agreement among all assigned functional-area subject matter experts (SMEs) that the item addresses what it purports to address. There shall

also be a statistically significant agreement that the item is formulated to measure either performance in an operational setting (i.e., performance measures) or performance-oriented knowledge (i.e., knowledge items).

The contents of the test item bank shall be cross-referenced to products such as task or subtask identification numbers, accompanying graphics and tests. All test items shall be keyed to approved terminal or supporting objectives. Maintaining the test item bank shall be supported by additional processes located in the process, Maintain Tests. These processes shall allow test developers to construct performance tests, consisting of oral test guides (OTG) and performance evaluation checklists (PECs) and knowledge tests consisting of true/false, multiple choice, matching, and/or other test items selected from the data store.

3.7.1.3.2 Maintain Tests. The system shall provide test developers with the capability to develop, store, analyze and validate knowledge and performance tests.

3.7.1.3.2.1 Develop/Revise Tests. The system shall provide capabilities to format, edit and expand component parts of evaluation modules. Evaluation modules will consist of the complete set of evaluation materials developed to evaluate task performance and task requisite knowledge for a particular AFS task. Modular evaluation materials will be developed that validly assess airman task competencies for certification, recertification, and training quality control.

3.7.1.3.2.2 Analyze evaluation materials. The system shall analyze evaluation materials which have been developed and implemented. Data to be analyzed shall be consolidated and sorted to support a pre-determined number of samples for each test. The Evaluation Subsystem shall support automatic and requested analyses. Analysis results shall be printed in a form suitable for use in validating the evaluation materials.

The system shall support the analysis of a given test and its items using one or more of the following criteria:

- a. samples administered between specified dates
- b. samples passed
- c. samples failed
- d. all samples.

3.7.1.3.2.3 Validate evaluation materials. The system shall provide hard copy printouts of knowledge test items and performance measure analyses to support the validation of evaluation modules against a criterion of job performance in an operational setting, in accordance with the Air Force ISD policy. The system shall provide the capabilities to identify materials requiring changes and to revise those materials as necessary.

3.7.2 Performance evaluation component requirements. The Performance Evaluation Component shall provide capabilities to administer and score requisite knowledge tests and performance tests. The Performance Evaluation Component shall collect task evaluation results, for use both in assessing individual task performance and in determining the adequacy of training. This component shall support pre-training, post-training and quality control evaluations. The collection and recording of all evaluation results shall be possible by online procedures with interactive computer terminals, and off-line procedures, utilizing keyboards or machine readable forms and optical mark readers. The system shall enable supervisors and evaluators to:

- a. Administer requisite knowledge tests on line and off line
- b. Test task mastery by observation of task performance or product evaluation off line
- c. Score tests and collect/maintain evaluation results
- d. Maintain accountability of materials printed for offline use.

3.7.2.1 Administer knowledge tests on line. On-line knowledge testing shall present test items, accept trainee's selected answers, and allow the trainee to review and change the selected answers before the test is scored. The system shall have the capability to provide immediate feedback to a trainee taking an on line knowledge test (i.e., score the knowledge test, display any missed items, and indicate the correct answer for missed items immediately after a trainee completes a test).

3.7.2.2 Administer evaluations off line. The system shall be able to print up to 75 copies of an off-line test in response to a single authorized request. The system shall print the identical test control number on each copy printed for a respective print request (i.e., if 15 copies are requested, 15 identical copies will be printed and all 15 copies will have the same test control number). The system shall be able to print a knowledge test answer key if the key is requested at the time that the

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knowledge test is printed. No answer key shall be available or printed for a performance test.

3.7.2.3 Score tests and provide feedback. The system shall be able to score tests presented on line or off line and report the test results to designated subcomponents or processes. Off-line test results shall be entered with a key board or an optical mark reader scan sheet. The system shall check off-line knowledge test results against the knowledge test answer key files. The system shall accept pass/fail results for each performance step and the performance test as a whole.

3.7.2.4 Account for off-line evaluation materials. The system shall enable accountability of evaluation materials which are printed for off line administration.

3.7.3 Training quality control component requirements. The Training Quality Control Component shall provide task performance evaluations to assess effectiveness of AOTS training. This third-party evaluation shall allow for evaluation by individuals independent of the trainer/trainee process.

3.7.3.1 Select QC Evaluation candidates. The periodic selections for a quality control evaluation event shall include the task to be evaluated, the airman to be evaluated, and two external evaluators. An automatic process shall identify the evaluatee and external evaluator candidates for each task identified for quality control task evaluation. The process by which the system identifies tasks, evaluatees, and external evaluators for quality control evaluation events shall recycle until a predetermined number of QC evaluation matches have been identified. The subsystem shall notify the QC Administrators, through the Training Management Component, of tasks, evaluatees, and evaluators identified as candidates for training quality control. The subsystem shall also support manual selections of tasks, evaluatees and evaluators for quality control evaluations.

3.7.3.2 Initiate quality control events. The system shall allow QC Administrators to initiate quality control evaluation events. The actual scheduling of QC events shall take place in the Management Subsystem; data to initiate each QC evaluation shall result from the Training Quality Control Component of the Evaluation Subsystem, or shall be manually determined by the QC Administrator.

3.7.3.3 Follow up quality control evaluation event. QC evaluations shall be administered and scored using the same processes

as for task performance evaluations, accomplished within the Performance Evaluation Component. The Evaluation Subsystem shall provide a capability to enter quality control evaluation results into the computer support system by means of appropriate off-line data entry devices, such as optical mark readers or keyboards. When a QC evaluation is failed, a notice to the commander recommending decertification on the task will be generated. Records of quality control evaluation events, results and decertification actions shall be maintained for system report generation, as required. These summary reports of training quality control activities will be an additional source of data beyond the notification of decertification recommendations provided to the appropriate commander, workcenter supervisor, and unit training manager.

3.7.4 System evaluation component requirements. The System Evaluation Component of the Evaluation Subsystem shall collect, maintain, and report data regarding the performance of the prototype AOTS in meeting system goals for training quality and task performance. The reports shall include standard reports generated at periodic intervals for prespecified report recipients, and ad hoc reports generated on demand by authorized report recipients to address specific AOTS performance aspects.

3.7.4.1 Consolidate/sort reports data. The procedures used in the generation of both the standard and the ad hoc reports shall include sorting capabilities, and a means of specifying unique report formats, as required. System historical data shall be maintained, so that aggregate data can be reported by work center, unit, base, or trainer/evaluator. Both standard reports and ad hoc reports shall include data summaries and statistical analyses, as required. The reports provided shall be suitable for utilization at work center, unit, base, MAJCOM, and Air Staff levels.

3.7.4.2 Calculate data and generate reports. The system shall provide statistical summarization for both standard and ad hoc reports.

3.7.4.2.1 Standard reports. The standard reports shall be generated by the system, based on menu-driven options keyed to user data needs requirements. Summaries which identify existing or potential training problems affecting mission readiness shall be provided. The primary focus of these summaries and reports shall be the training management requirements of the operational work centers and units. These management information reports shall furnish up-to-date information on training effectiveness. Such reports shall include the following type of information:

- a. Position qualification status
- b. Impact of Personnel Loss
- c. Workcenter Coverage
- d. Upgrade Training Summaries
- e. Evaluator Performance Data/Summaries
- f. Trainer Performance
- g. Training Event Summaries
- h. CDC Status
- i. Recurring Training Requirements.

3.7.4.2.2 Ad Hoc reports. The system shall allow the user to request a user-defined data analysis and formatted report when standard reports do not meet the need and data are available in the AOTS data stores to support the request. The system shall be flexible and, therefore, capable of generating a variety of ad hoc reports through an automated process available to system administrators.

3.8 Precedence. When the application of the requirements of the AOTS contract, this specification, or other applicable documents, are in conflict, the following order of precedence shall apply:

- a. AOTS Contract. The terms of the contract shall have precedence over all other documents.
- b. This specification. For the performance and design requirements of the Evaluation Subsystem, this specification shall, with the exception of the AOTS contract, take precedence over all other program documents and applicable documents.
- c. Other applicable documents. Other documents referenced within this specification shall have precedence, unless they conflict with the AOTS contract or this specification.

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4. QUALITY ASSURANCE PROVISIONS

4.1 General. Sections 4.1.1 and 4.2 identify and describe the Quality Assurance provisions applicable to the Evaluation Subsystem of the prototype AOTS. These sections document the practices which shall be employed by the contractor to ensure adequate control and to establish conformance with the SOW and specifications. Quality Assurance testing shall take place at Bergstrom AFB, TX. The contractor shall be responsible for conducting the Evaluation Subsystem Tests.

4.2 Quality conformance inspections. Verification of performance with each requirement in Section 3 shall be the responsibility of the contractor. The methods used to verify these requirements shall be as specified in Table I.

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TABLE I QUALITY CONFORMANCE INSPECTION

SECTION	N/A	INSPECT	ANALYZE	TEST	DEMO
3	X				
3.1	X				
3.1.1	X				
3.1.1.1	X				
3.1.1.2	X				
3.1.1.3	X				
3.1.1.4	X				
3.1.2	X				
3.1.2.1		X			
3.1.2.1.1	X				
3.1.2.1.1.1		X			
3.1.2.1.1.2		X			
3.1.2.1.2		X			
3.1.2.1.3		X			
3.1.2.1.4	X				
3.1.2.1.4.1					X
3.1.2.1.4.2					X
3.1.2.2	X				
3.1.2.2.1		X			
3.1.2.2.2		X			
3.1.2.3	X				
3.1.2.3.1		X			
3.1.2.3.2		X			
3.1.2.3.3		X			
3.1.3	X				
3.1.4		X			
3.1.5	X				
3.2	X				
3.2.1		X			
3.2.2	X				

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TABLE I QUALITY CONFORMANCE INSPECTION Cont.

SECTION	N/A	INSPECT	ANALYZE	TEST	DEMO
3.2.3		X			
3.2.4			X		
3.2.5	X				
3.2.6	X				
3.3	X				
3.3.1	X				
3.3.2	X				
3.3.3	X				
3.3.4	X				
3.3.5	X				
3.3.6	X				
3.3.7		X			
3.4	X				
3.5	X				
3.5.1		X			
3.5.2	X				
3.5.3	X				
3.6	X				
3.6.1	X				
3.6.2	X				
3.7		X			
3.7.1		X			
3.7.1.1		X			
3.7.1.2		X			
3.7.1.2.1		X			
3.7.1.2.2		X			
3.7.1.3		X			
3.7.1.3.1		X			
3.7.1.3.2		X			
3.7.1.3.2.1		X			

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TABLE I QUALITY CONFORMANCE INSPECTION Cont.

SECTION	N/A	INSPECT	ANALYZE	TEST	DEMO
3.7.1.3.2.2		X			
3.7.1.3.2.3		X			
3.7.2		X			
3.7.2.1		X			
3.7.2.2		X			
3.7.2.3		X			
3.7.2.4		X			
3.7.3		X			
3.7.3.1		X			
3.7.3.2		X			
3.7.3.3		X			
3.7.4		X			
3.7.4.1		X			
3.7.4.2		X			
3.7.4.2.1		X			
3.7.4.2.2		X			
3.8	X				

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5. PREPARATION FOR DELIVERY

5.1 General. This section is not applicable to this specification.

5.2 Preservation and packaging. This section is not applicable to this specification.

5.3 Packing. This section is not applicable to this specification.

5.4 Marking for shipping. This section is not applicable to this specification.

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6. NOTES

6.1 Intended use. This specification is to be used in the establishment of uniform practices to ensure the inclusion of essential requirements for the development and implementation of the Evaluation Subsystem for the prototype AOTS.

6.2 Changes from previous issue. Asterisks or vertical lines are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

SECTION 10, APPENDIX I

10. DATA FLOW DIAGRAMS

10.1 Scope. This appendix establishes the design and the interface requirements for the Evaluation Subsystem. A structured system analysis approach has been employed, using data flow diagrams (DFDs) to illustrate the design.

10.2 Data flow diagram symbols. The following describes and illustrates the DFD symbols used:

- a. Square: an external entity symbol. A source and/or destination of data outside the subsystem, component, or process being described. Numbered references of the external entity are contained in the top left corner of the square. Each defined external entity is shown in 10.3. Entities external to AOTS are numbered according to the convention established in the Management Subsystem Specification, 70S5647100.
- b. Arrow: data flow symbol. A pathway along which data moves into, around, and out of the subsystem or component. Each data flow is labeled. Definitions for data flows are organized alphabetically by component in Appendix II.
- c. Rounded rectangle: a process symbol. A function of the subsystem or component which logically "transforms" data. The processes are labeled numerically, beginning with "1", on each data flow diagram. The numbering system follows a logical decimal scheme to trace from one process to another. For example, Process 1, Develop Behavioral Objective Data of DFD 2.1.1 (Maintain Behavioral Objectives Data) can also be referred to as process 2.1.1.1. Definitions and descriptions for processes are organized numerically by component in Appendix II. An asterisk located to the right of the number (e.g., 1*) indicates that at least part of the process is manual. The data dictionary entries for the processes marked with an asterisk identify the manual part(s) of the processes.
- d. Open-ended rectangle: a data store symbol. A place in the subsystem or component where data are stored in some way. The numbering scheme for identifying the data stores is shown in 10.3. Definitions and contents of data stores are given in numerical order by component in Appendix II.

10.3 AOTS Evaluation subsystem DFD numbering.

a. Data Stores

- E1 Consolidated Behavioral Objectives Data
- E2 Bad Verb List
- E3 Test Item Bank
- E4 Consolidated Test Data
- E5 Consolidated Log Records
- E6 Consolidated Test Score Data
- E7 Test Key File
- E8 Quality Control (QC) Log
- E9 Consolidated Training Reports Data
- E10 Training Reports

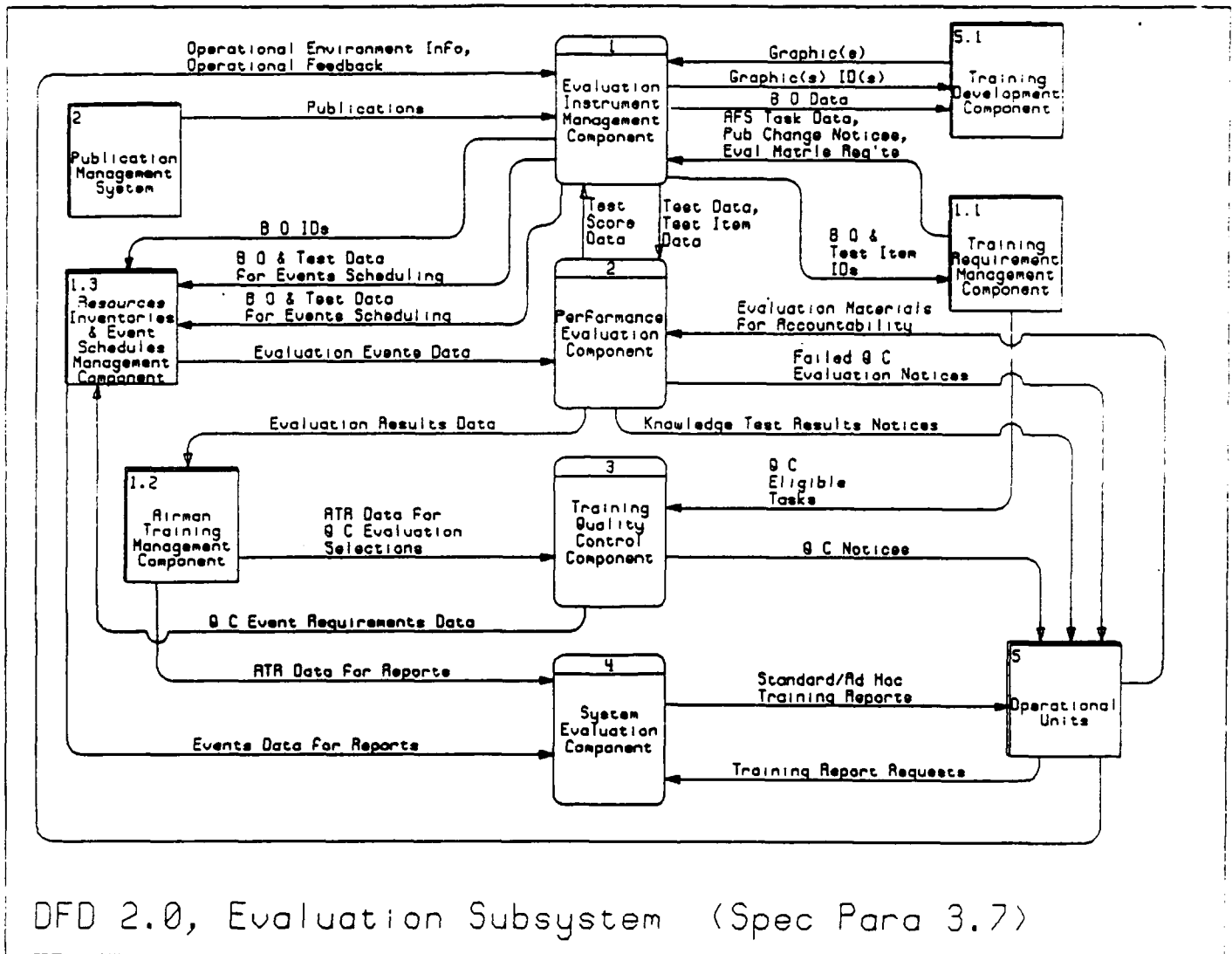
b. External Entities Within AOTS

- 1.1 Training Requirements Management Component
- 1.2 Airman Training Management Component
- 1.3 Resources Inventories and Event Schedules Management Component
- 3.0 Computer Support Subsystem
- 4.0 Personnel and Support Subsystem
- 5.1 Training Development Component

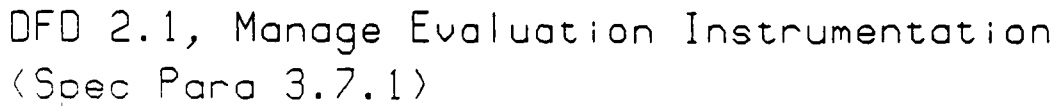
c. External to AOTS

- 2 Publications Management
- 5 Operational Units

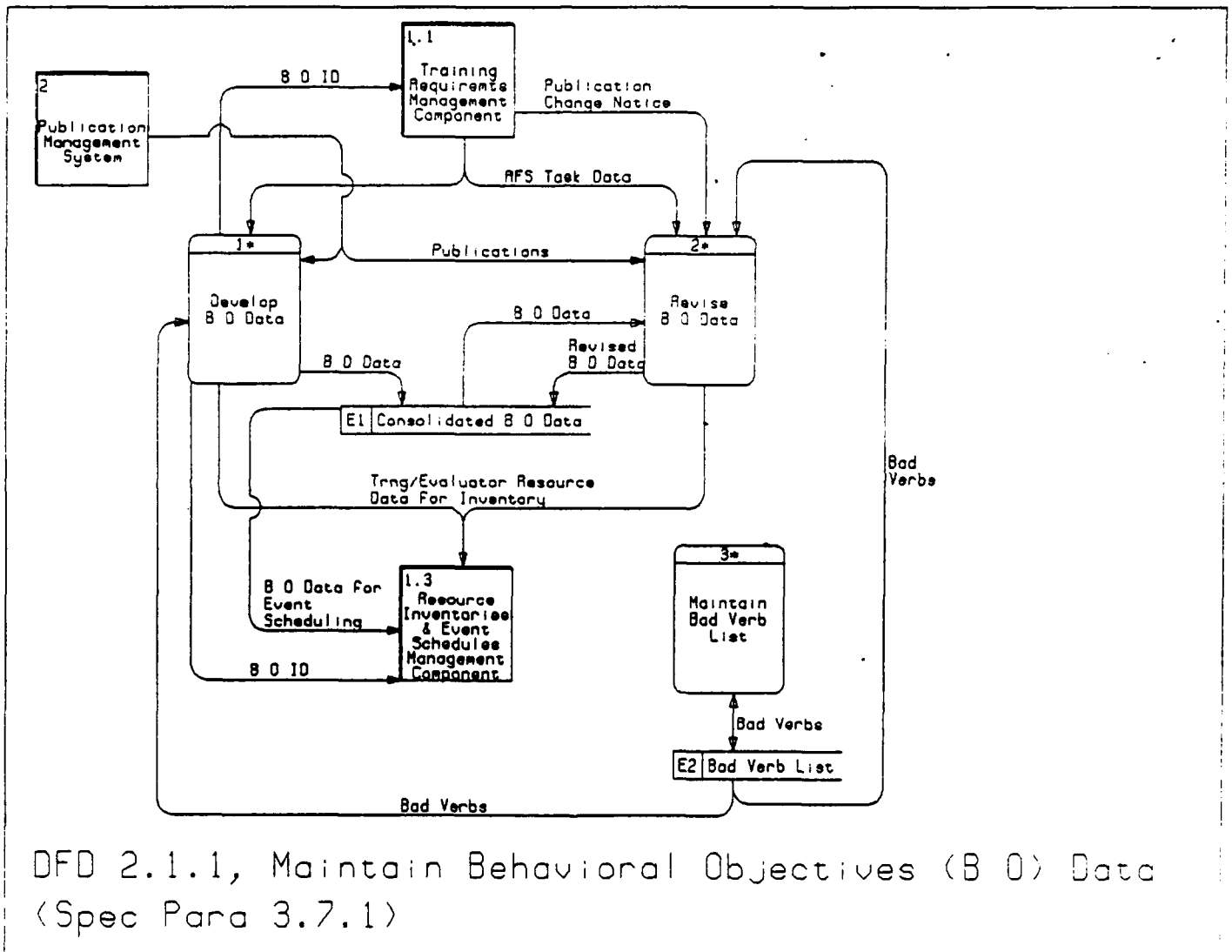
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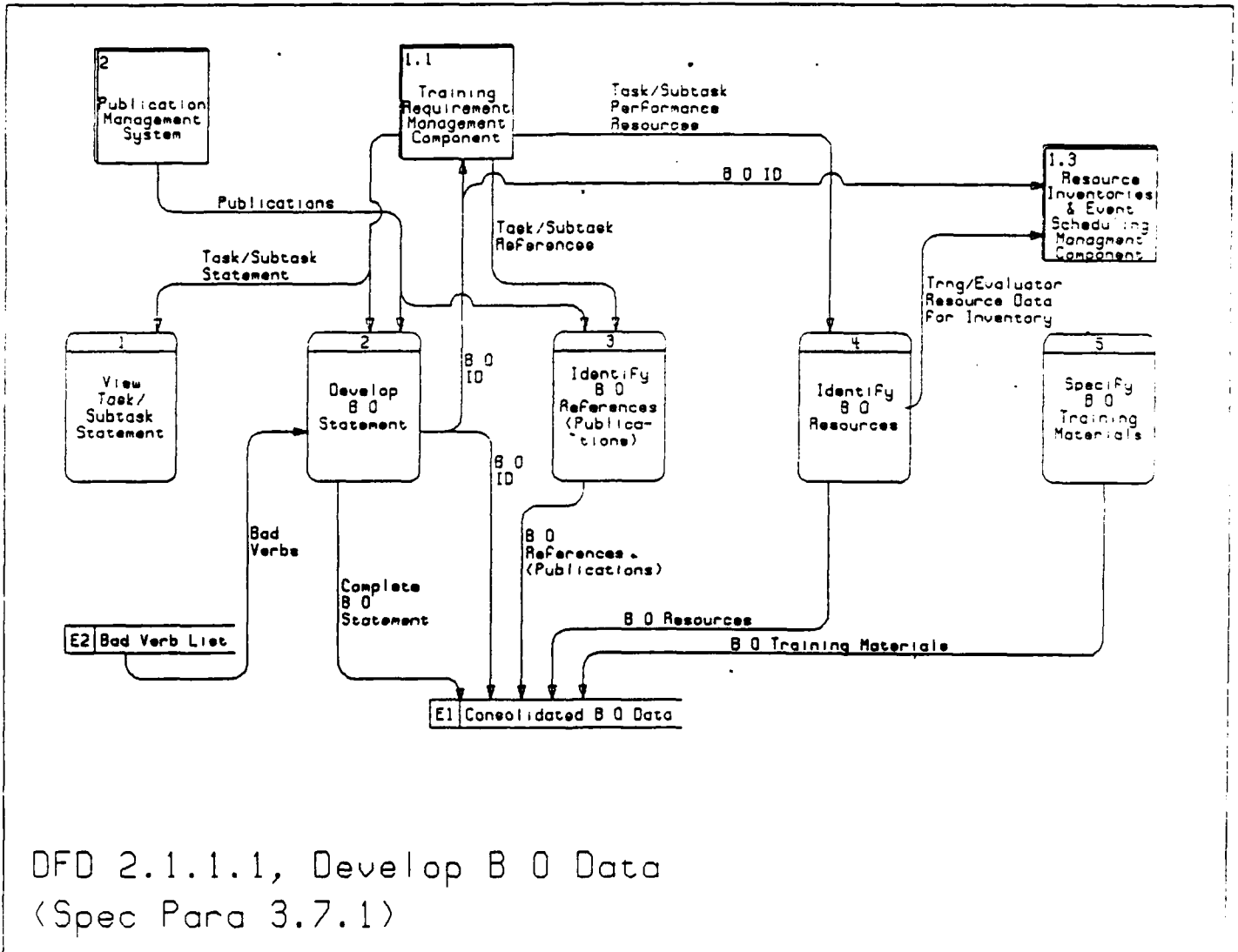
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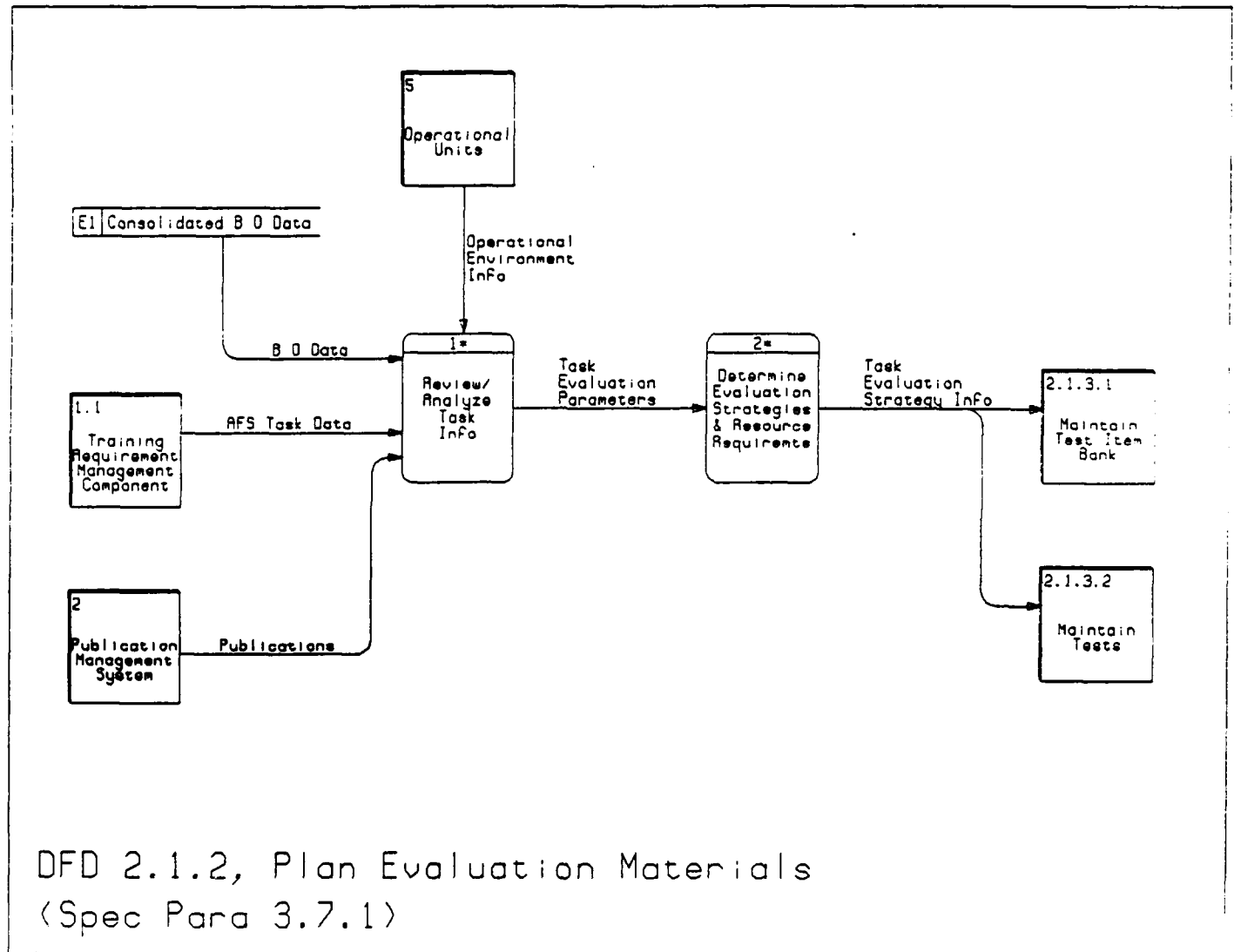
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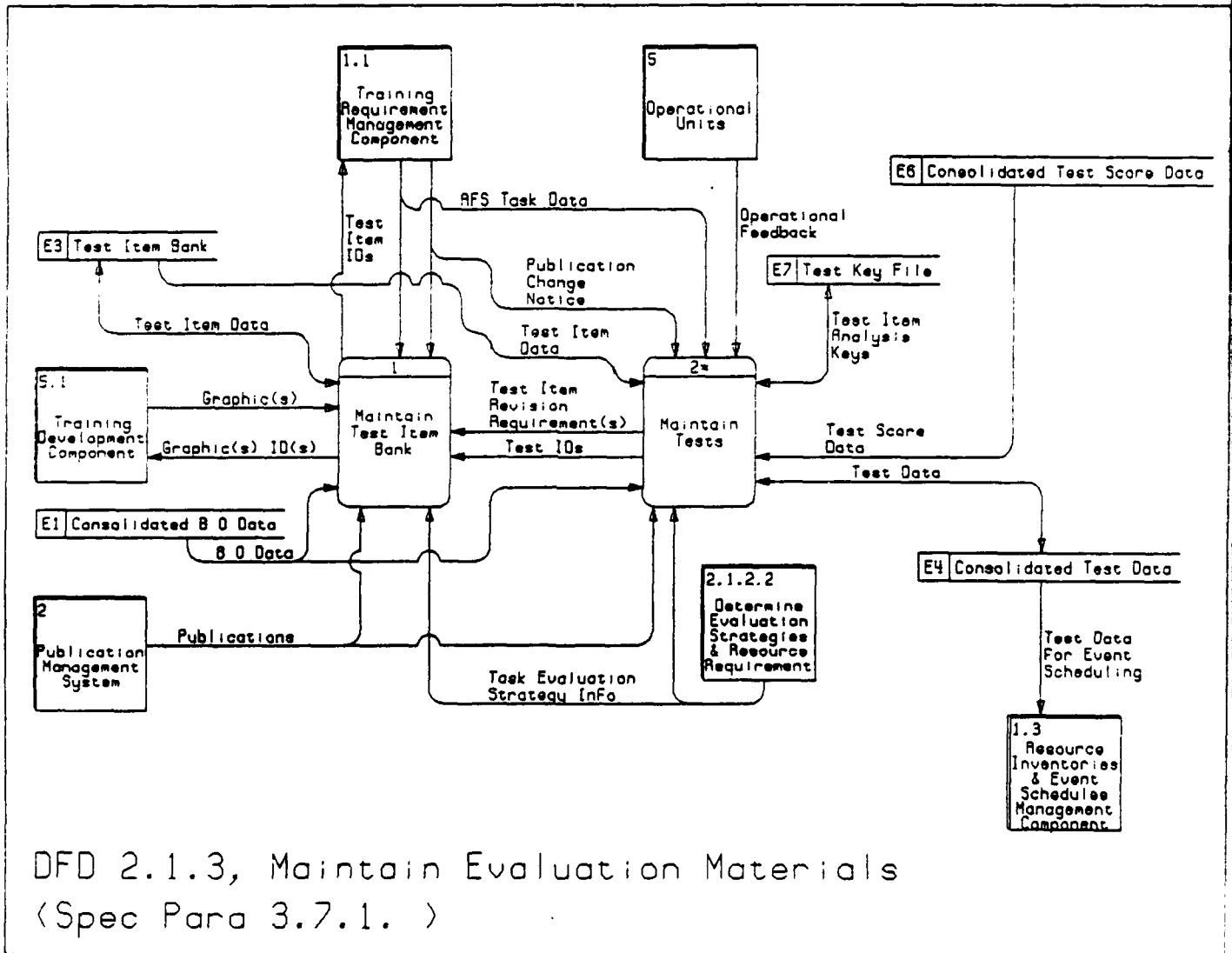
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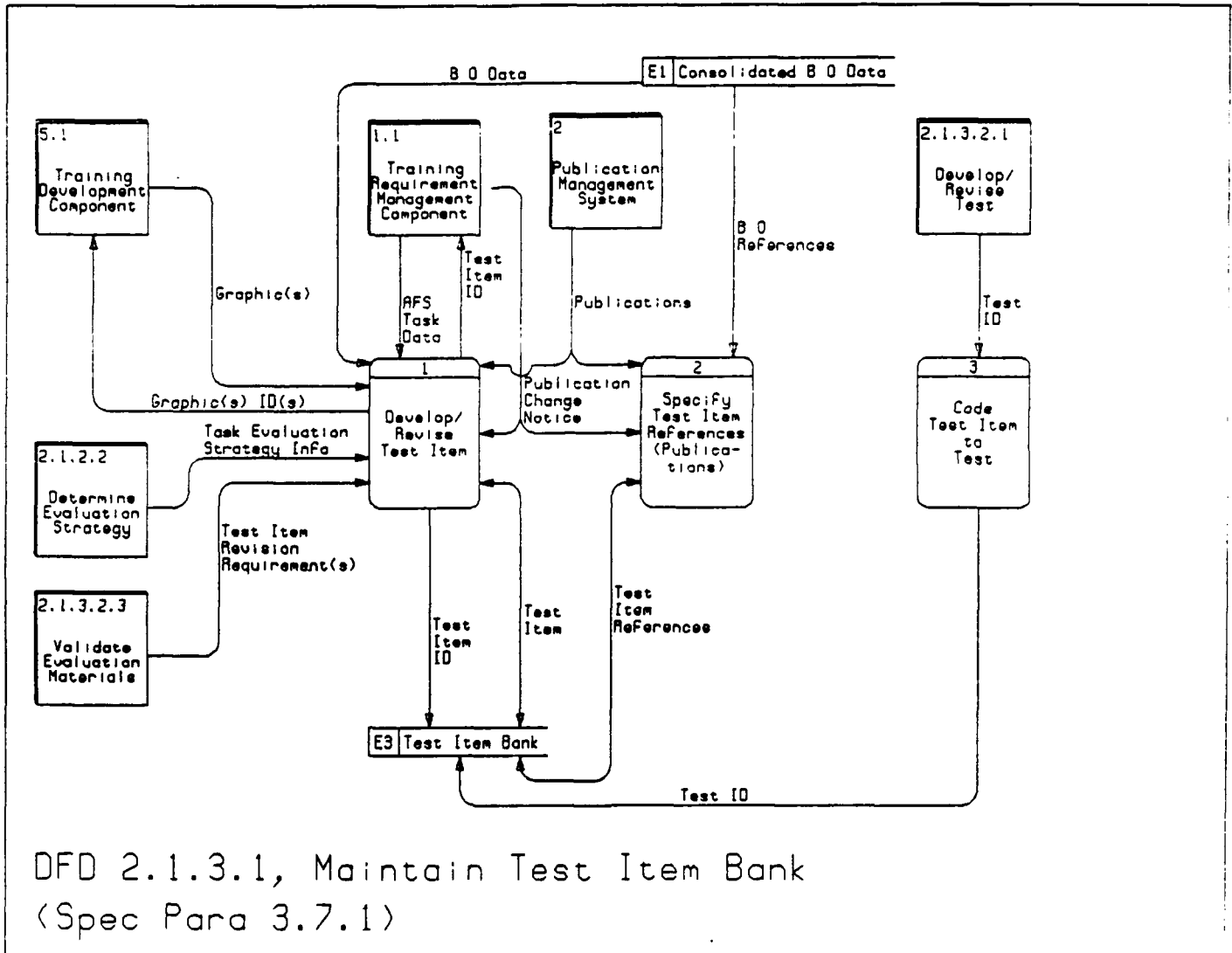
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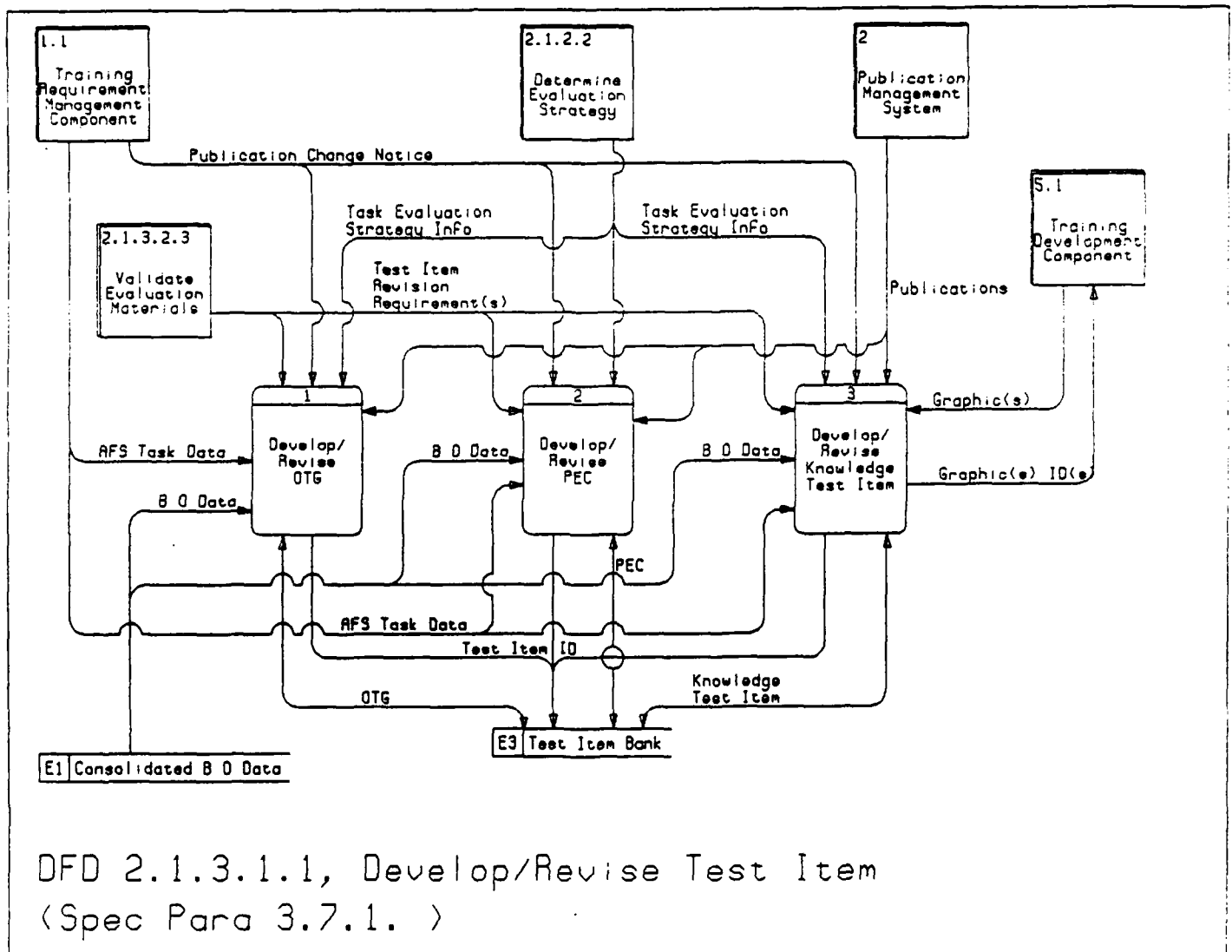
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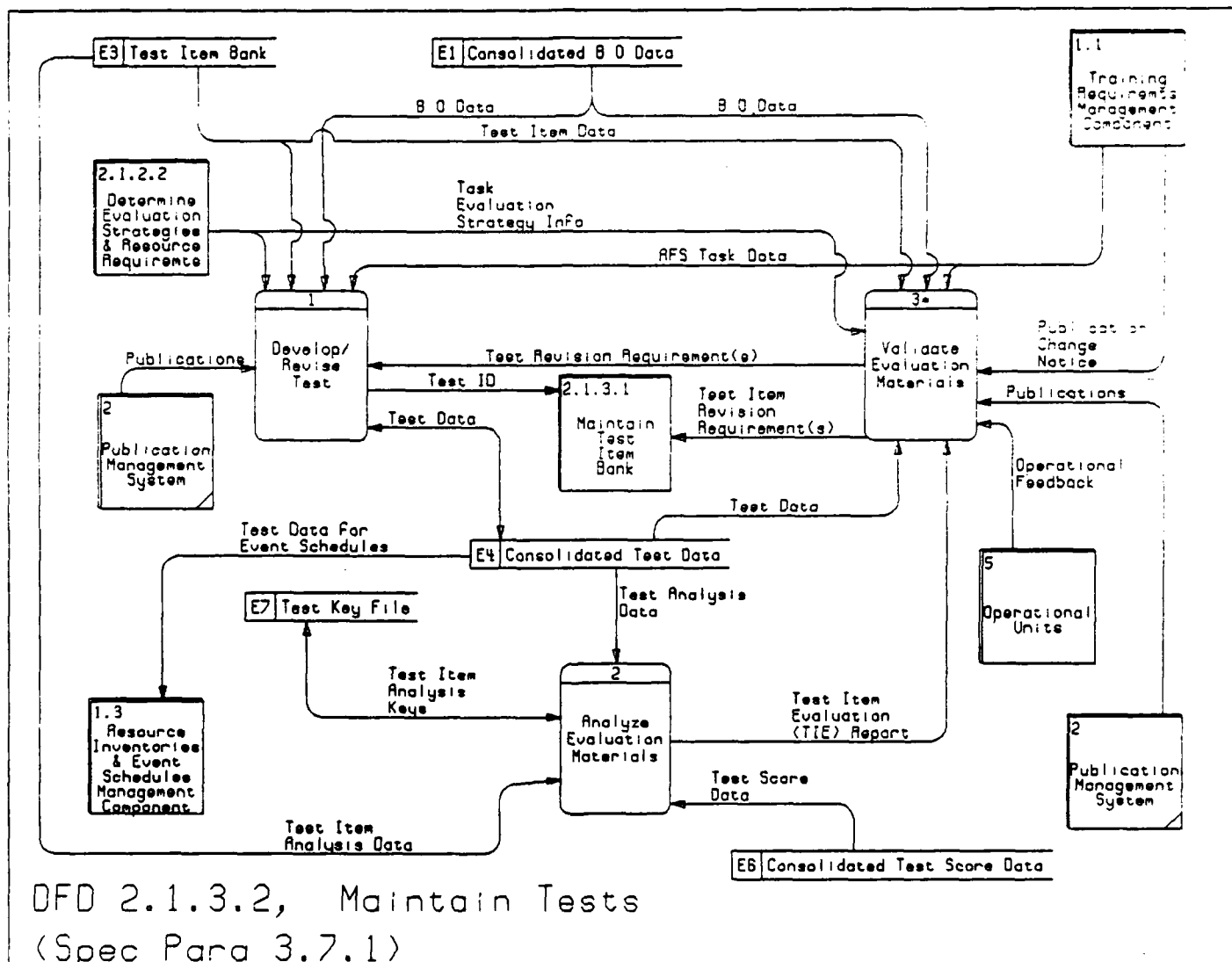
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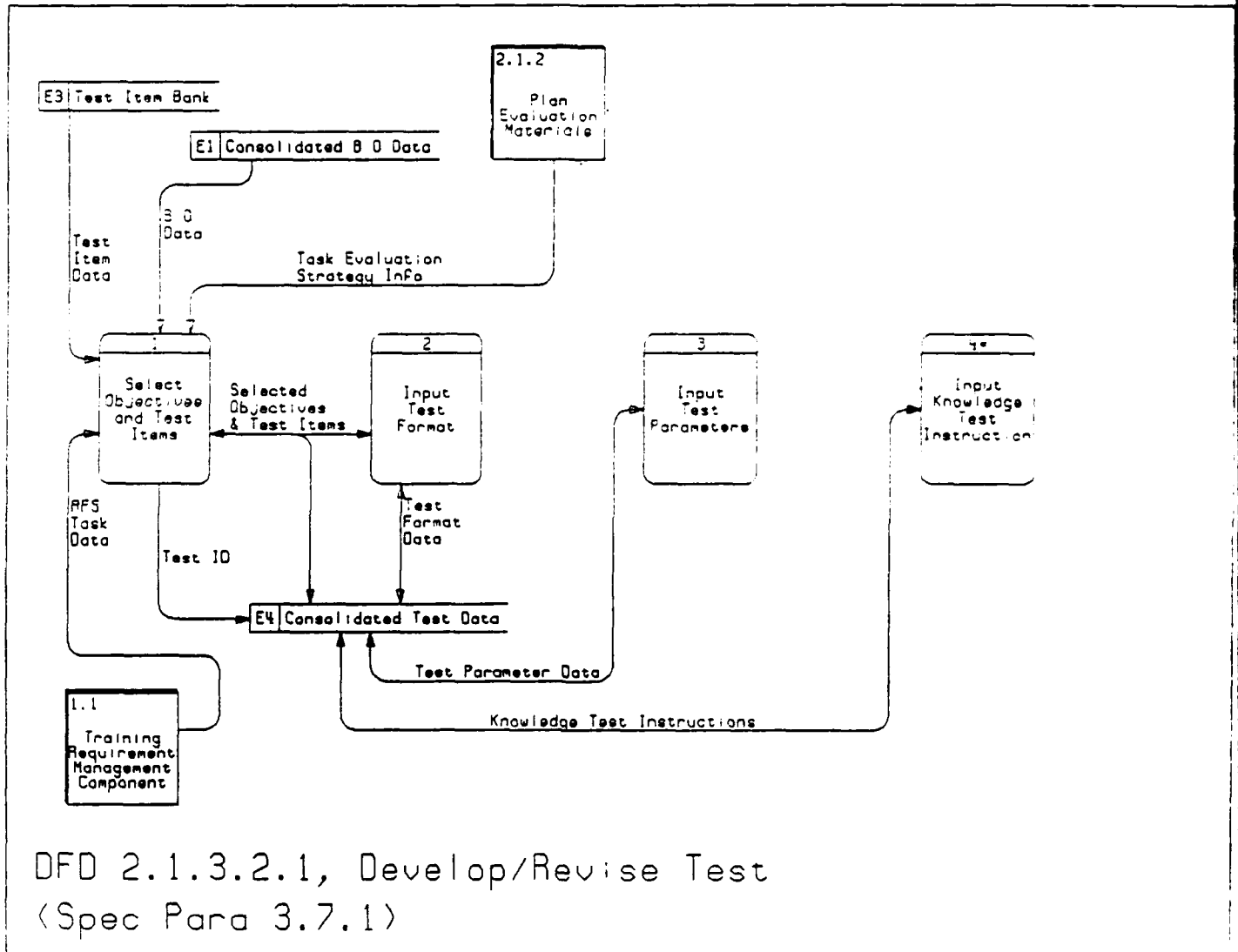
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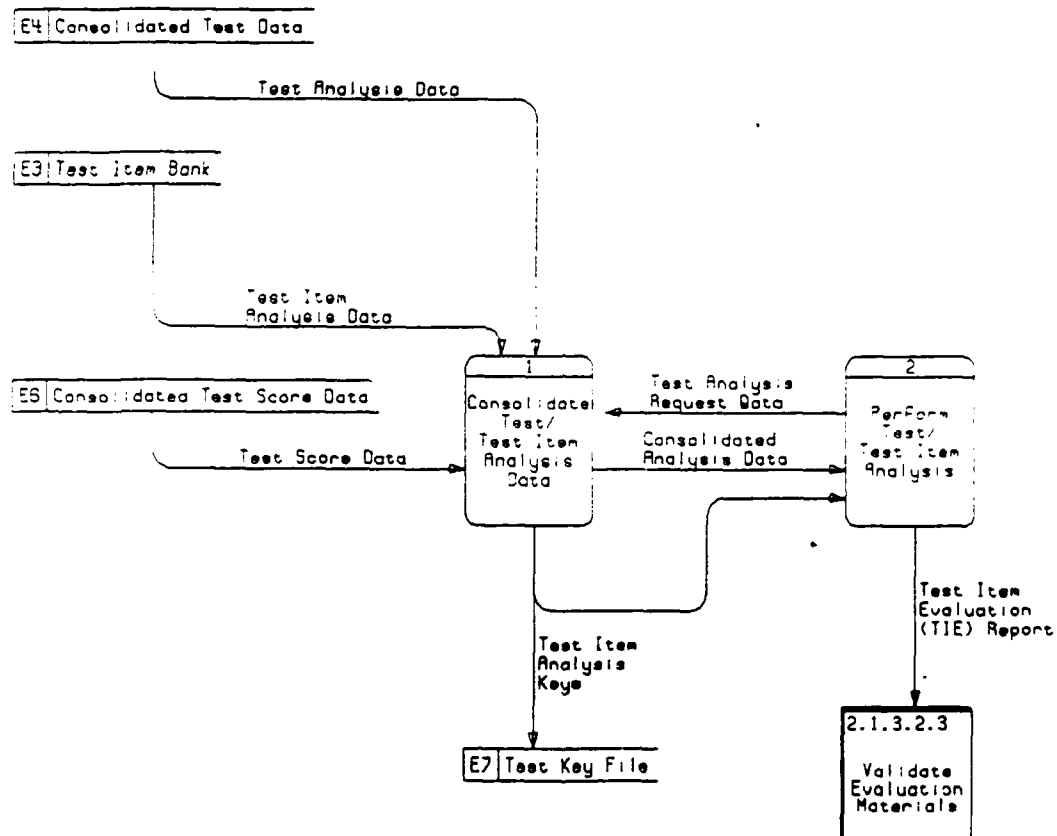
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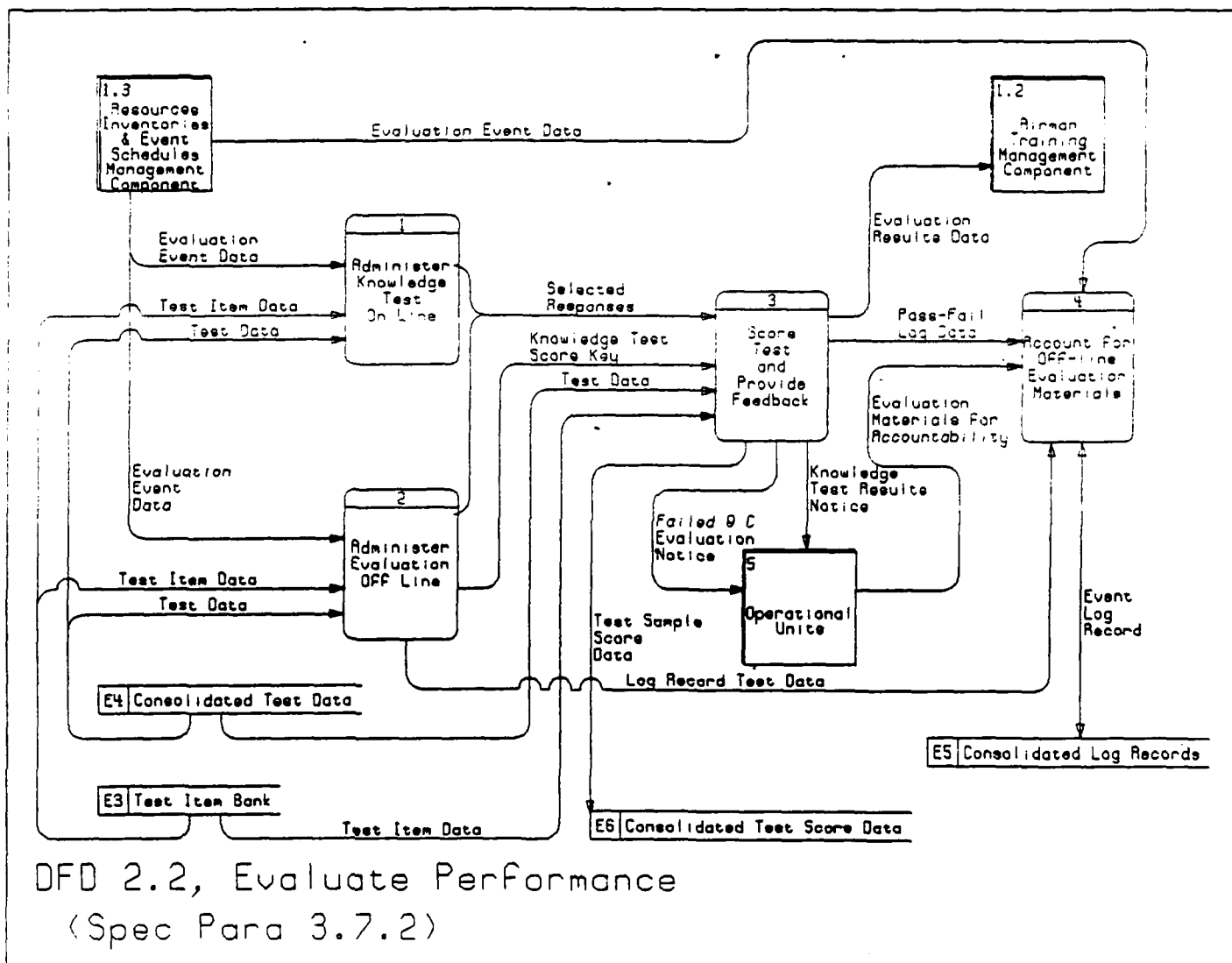


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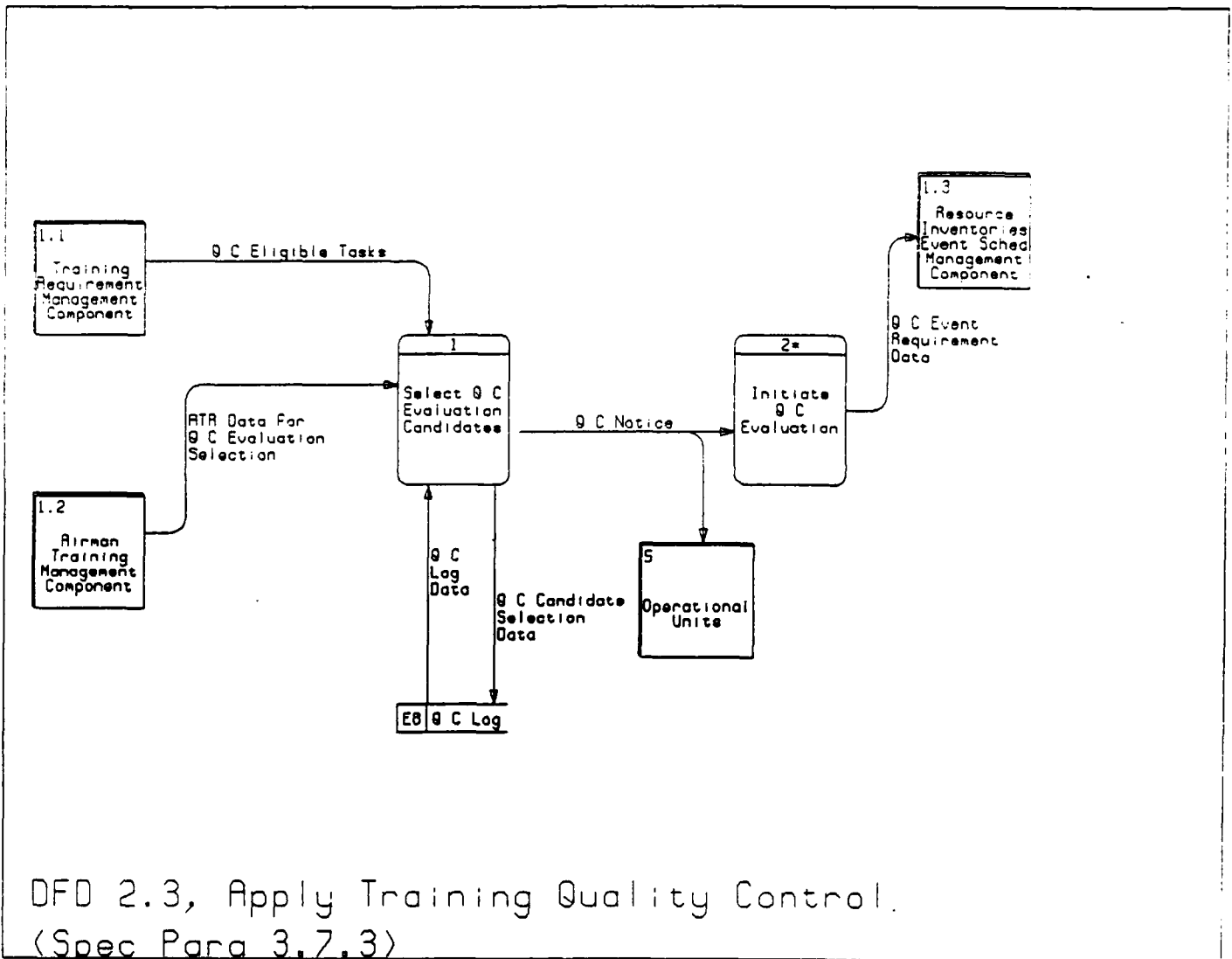


DFD 2.1.3.2.2, Analyze Evaluation Materials
(Spec Para 3.7.1)

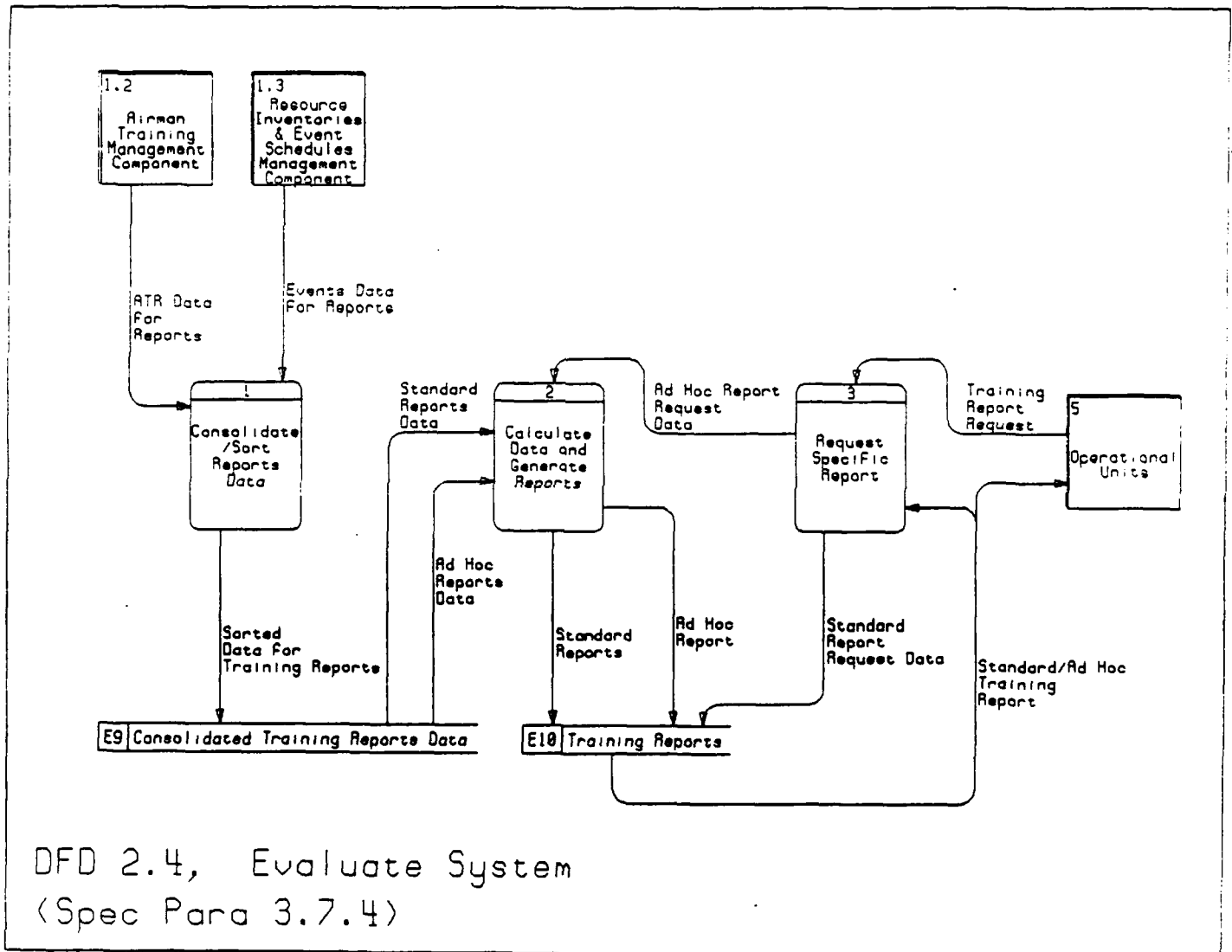
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SECTION 20, APPENDIX II

20. DATA DICTIONARIES

20.1 Scope. This appendix contains data dictionaries providing more detailed explanations of the processes, data flows, and data stores. The material is as follows:

- a. Data processes - The highest level processes were described in the text of Section 3.7. The lower level processes, which were broken down in Appendix I, are described here. They are numerically organized by component and include the process name, the level of automation involved, description of the process, and its structure. The levels of automation are defined as follows:
 - (1) Manual process - A process performed either partially or totally off line. For example, the process "validate evaluation modules" is performed off line by reviewing a hardcopy print of test item analysis.
 - (2) Automated process - A process performed by user interaction with the system using a keyboard, touch pad, and/or running a form through an optical mark reader. For example, entering the text, alternatives, and designating the correct response for a question.
 - (3) Automatic process - A process performed entirely by the computer once the proper commands have been entered. For example, "access control" when a user logs on to the system.
- b. Data flows - Contains a description giving depth to the data flow lines on each DFD. They are alphabetically organized by component. Each data flow explanation contains the data source, data destination, and structure when known.
- c. Data stores - Contains a description of the data contained within the data store. They are numerically organized by component. Each data store explanation also contains the data sources, data destinations, and the structure.

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The Data Dictionary is organized as follows:

- 20.2 Evaluation Instrument Management Component Processes.
- 20.2.1 Evaluation Instrument Management Component Data Flows.
- 20.2.2 Evaluation Instrument Management Component Data Stores.
- 20.3 Performance Evaluation Component Processes.
- 20.3.1 Performance Evaluation Component Data Flows.
- 20.3.2 Performance Evaluation Component Data Stores.
- 20.4 Training Quality Control Component Processes.
- 20.4.1 Training Quality Control Component Data Flows.
- 20.4.2 Training Quality Control Component Data Stores.
- 20.5 System Evaluation Component Processes.
- 20.5.1 System Evaluation Component Data Flows.
- 20.5.2 System Evaluation Component Data Stores.

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20.2 Evaluation Instrument Management Component Processes.

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PROCESS: 2.1, Manage Evaluation Instruments

LEVEL OF AUTOMATION: Manual, automated, automatic

DESCRIPTION: This process shall enable authorized personnel to plan, develop, maintain, deliver, analyze and validate instruments used for evaluation purposes. Such instruments shall include behavioral objectives, test items and tests.

DATA INPUT: AFS Task Data
Publications
Publication Change Notices
Evaluation Materials Requirements
Operational Environment Info
Operational Feedback
Graphics

DATA OUTPUT: BO IDs
BO Data
BO & Test Data for Events Scheduling
Test Item IDs
Test Item Data
Test Data
Trng/Evaluator Resource Data for Inventory

STRUCTURE: This process will include the following subprocesses:

- Process 2.1.1, Maintain Behavioral Objectives Data
- Process 2.1.2, Plan Evaluation Materials
- Process 2.1.3, Maintain Evaluation Materials

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Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.1.1, Maintain Behavioral Objectives (BO) Data

LEVEL OF AUTOMATION: Automated, automatic

DESCRIPTION: This process shall enable BO developers/revisers to develop, revise, save, delete, copy, order, review and print behavioral objective data for tasks and subtasks. This process shall also enable BO developers/revisers to maintain a Bad Verb List which contains unacceptable verbs that are matched against the verb in each behavioral objective statement under development or revision.

Behavioral objective data shall be maintained for each task and subtask. BO data shall be keyed, to make evident the association of data for a specific behavioral objective and to link the behavioral objective to the respective subtask and/or task.

DATA INPUT: Evaluation Materials Requirements
AFS Task Data
Publications
Publication Change Notice

DATA OUTPUT: BO IDs
BO Data
Trng/Evaluator Resource Data for Inventory
BO Data for Event Scheduling

STRUCTURE: This process will include the following subprocesses:

- 2.1.1.1, Develop BO Data
- 2.1.1.2, Revise BO Data
- 2.1.1.3, Maintain Bad Verb List

Note: No further details are provided within this specification for the functions of saving, deleting, copying, ordering, reviewing and printing behavioral objective data.

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PROCESS: 2.1.1.1, Develop BO Data

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to enter and/or select data pertaining to a specific behavioral objective. The BO developer shall be able to:

1. Develop the behavioral objective statement,
2. Identify references (publications and their breakdowns) that apply to the behavioral objective,
3. Identify training, evaluator and performance resources that apply to the behavioral objective, and
4. Identify training materials that apply to the behavioral objective.

This process shall enable a person to develop BO data for a task (called a terminal behavioral objective) or for a subtask (called a supporting behavioral objective). Up to six terminal objectives shall be allowed for each task and up to six supporting objectives shall be allowed for each subtask.

The developer shall review task analysis data (task/subtask statement, resources, references, skills, knowledges, activities, etc.) to determine the BO statement, BO references, BO resources and BO training materials that apply to a given task/subtask.

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PROCESS: Develop BO Data (continued)

DESCRIPTION: (continued)

A Behavioral Objective ID shall be automatically established for the newly developed BO, to link the BO to the respective task/subtask and to link the BO data to the respective behavioral objective.

- To develop data for a behavioral objective, the developer shall be required to enter or select the respective Task/Subtask ID for which the behavioral objective applies.
- All data developed for an objective shall be automatically keyed (linked) to the behavioral objective ID.

DATA INPUT: AFS Task Data
Bad Verbs
Publications

DATA OUTPUT: BO ID
BO Data
Trng/Evaluator Resource Data for Inventory
BO Data for Event Scheduling

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.1.1.1 View Task/Subtask Statement
- Process 2.1.1.1.2 Develop BO Statement
- Process 2.1.1.1.3 Identify BO References
- Process 2.1.1.1.4 Identify BO Resources
- Process 2.1.1.1.5 Specify BO Training Materials

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.1.1.1.1, View Task/Subtask Statement

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to review the task or subtask statement which applies to a given behavioral objective under development. Upon the developer's request, the system shall display the respective task/subtask statement. The task/subtask statement shall not be altered via this process.

DATA INPUT: Task/Subtask Statement

DATA OUTPUT: N/A

STRUCTURE: N/A

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PROCESS: 2.1.1.1.2, Develop BO Statement

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to input a narrative behavioral objective statement for a given task or subtask. A complete behavioral objective statement shall consist of:

1. An explicitly stated behavior,
2. The operational conditions and parameters, and
3. The standards or criteria used to demonstrate trainee mastery.

This process shall enable the developer to input the behavioral objective statement in one of two ways:

1. The EXPERT mode shall enable the developer to input the complete behavioral objective statement in one continuous step.
2. The NOVICE mode shall enable the developer to separately input the components (behavior, conditions and standards) of the behavioral objective statement.

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PROCESS: Develop BO Statement (continued)

DESCRIPTION: (continued)

In the EXPERT mode, the developer shall be able to copy and accept or expand the task/subtask statement to develop the complete BO statement. Once the complete BO statement has been entered, the statement verb shall be automatically matched against the verbs contained on the Bad Verb List (see process 2.1.1.3).

- If the statement verb matches a verb on the list, the behavioral objective statement shall not be accepted and the developer shall be required to re-enter an acceptable verb.
- If the statement verb does not match any verb on the list, the BO statement shall be accepted.

In the NOVICE mode, the developer shall be able to copy and accept or expand the task/subtask statement to develop the behavior component of the BO statement. Once the behavior component has been entered, the verb shall be matched against the verbs contained on the Bad Verb List.

- If the behavior component verb matches a verb on the list, the behavioral component shall not be accepted and the developer shall be required to re-enter an acceptable verb.
- If the behavior component verb does not match any of the verbs on the list, the behavior component shall be accepted.

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PROCESS: Develop BO Statement (continued)

DESCRIPTION: (continued)

After the behavior component has been accepted, and the conditions and standards components have been entered by the developer, this process shall automatically combine the components to create the complete behavioral objective statement. Then, the developer shall be able to modify the complete behavioral objective statement.

Once a complete BO statement has been accepted, in either the EXPERT or NOVICE mode, a unique Behavioral Objective ID shall be automatically established. The objective ID shall enable the association of specific objective data for the BO, as well as the association of the BO to the respective subtask/task.

DATA INPUT: Task/Subtask Statement
Bad Verbs
Publications

DATA OUTPUT: Complete BO Statement
BO ID

STRUCTURE: N/A

Specification Number 70S647300B
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Date: 31 October 1989

PROCESS: 2.1.1.1.3, Identify BO References (Publications)

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to identify the task performance and proficiency references (publications) which pertain to a given behavioral objective. This process involves two functions:

1. Identifying the task/subtask publications which apply to a given BO, and
2. Specifying the publication breakdowns which apply to a given BO.

The developer shall identify the BO references by selecting one or more of the references that have been defined for the respective task/subtask. At the developer's request, the system shall display the task/subtask references. The developer shall be able to select and de-select one or more of the displayed references. Selected references shall be automatically highlighted or identified in some other way. This process shall not permit a developer to add a BO reference that has not already been identified as a reference for the respective task/subtask.

Once the behavioral objective publications have been identified, the developer shall be able to list the breakdowns (e.g., paragraphs, chapters, tables) which apply to any of the BO publications. Each breakdown shall be entered by keyboard input. Developers shall be able to add or delete breakdowns to or from the list.

DATA INPUT: Task/Subtask References
Publications

DATA OUTPUT: BO References

STRUCTURE: N/A

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PROCESS: 2.1.1.1.4, Identify BO Resources

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to identify the performance, training and evaluator resources required to perform, train and evaluate a given behavioral objective. This process involves three functions:

1. Identifying performance resources, which are the tools, equipment and materials (TEMs) necessary to accomplish the objective.
2. Identifying the training resources (e.g., slide projector, chalkboard) necessary when training someone to accomplish the objective.
3. Identifying the evaluator resources (e.g., stopwatch, clipboard) necessary when evaluating someone accomplishing the objective.

The developer shall identify the BO performance resources by selecting one or more of the respective task/subtask performance resources. At the developer's request, the system shall automatically display the task/subtask performance resources. The developer shall be able to select and de-select one or more of the performance resources displayed. Selected resources shall be automatically highlighted or identified in some other way. This process shall not permit a developer to add a BO performance resource that has not already been identified as a performance resource for the respective task/subtask.

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PROCESS: Identify BO Resources (continued)

DESCRIPTION: (continued)

The developer shall be able to list the BO training and evaluator resources, by entering the name of each resource. Training resources shall be listed separately from evaluator resources. The developer shall be able to add or delete training or evaluator resources to or from the respective list.

- If a training/evaluator resource is not one of the resources for which data are already being maintained by the system, the BO developer shall be able to enter additional data to add the resource to the system (process 1.3.1).

DATA INPUT: Task/Subtask Performance Resources

DATA OUTPUT: BO Resources
Trng/Evaluator Resource Data for Inventory

STRUCTURE: N/A

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.1.1.1.5, Specify BO Training Materials

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a BO developer to list the training materials that are associated with a given behavioral objective. Training materials shall include Computer Assisted Instruction (CAI) lessons, textbooks, training handbooks, Interactive Video Disk (IVD) lessons, films, and sound-on-slide presentations, among others.

Training Materials shall be identified by type of material (e.g, CAI, text, film), ID and name/description; these data shall be entered by keyboard input. Developers shall be able to add or delete materials to or from the list.

DATA INPUT: N/A

DATA OUTPUT: BO Training Materials

STRUCTURE: N/A

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PROCESS: 2.1.1.2, Revise BO Data

LEVEL OF AUTOMATION; Automated

DESCRIPTION: This process shall enable a BO reviser to: revise a behavioral objective statement and any references, resources and training materials that apply to a specific behavioral objective.

Data for a behavioral objective may require revision because of task performance or proficiency changes which occur to publications governing the task/subtask. Such changes in publications shall be identified (flagged) by the Management Subsystem, to alert a reviser that he/she should review the publications to determine if the respective BO data require changing. Changes in task/subtask publications may also cause changes in the task/subtask statement, resources, references, skills and knowledges and/or activities. The reviser shall be able to display or print these task data before revisions to BO data occurs.

The reviser shall be able to review the respective task/subtask statement (same as Process 2.1.1.1.1, View Task/Subtask Statement).

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PROCESS: Revise BO Data (continued)

DESCRIPTION: (continued)

When a behavioral objective statement requires revision, the revisor shall be able to modify any part or all of the complete BO statement. Once the revised BO statement has been entered, the statement verb shall be automatically matched against the verbs contained on the Bad Verb List.

- If the statement verb matches a verb on the Bad Verb List, the revised BO statement shall not be accepted and the reviser shall be required to re-enter an acceptable verb.
- If the statement verb does not match a verb on the Bad Verb List, the revised BO statement shall be accepted.

When BO references (publications) require revision, the same functions that apply to Process 2.1.1.1.3, Identify BO References, shall apply for this process.

When BO resources require revision, the same functions that apply to Process 2.1.1.1.4, Identify BO Resources, shall apply for this process.

When BO training materials require revision, the same functions that apply to Process 2.1.1.1.5, Specify BO Training Materials, shall apply for this process.

DATA INPUT: BO Data
AFS Task Data
Publications
Publication Change Notice
Bad Verbs

DATA OUTPUT: Revised BO Data
Tnrg/Evaluator Resource Data for Inventory

STRUCTURE: N/A

Specification Number 70S647300B
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PROCESS: 2.1.1.3, Maintain Bad Verb List

LEVEL OF AUTOMATION: Automated, automatic

DESCRIPTION: This process shall enable BO developers/revisers to maintain an on-line list of unacceptable BO statement verbs. Developers/revisers shall be able to: add verbs to the list; delete verbs from the list; and review the list on line.

The system shall automatically call up the Bad Verb List each time a person develops or revises a behavioral objective statement. The verb contained in a newly developed or revised behavioral objective statement shall be matched against each verb contained on the Bad Verb List. If a BO statement verb matches a verb on the Bad Verb List, the BO statement shall be rejected.

DATA INPUT: Bad Verbs

DATA OUTPUT: Bad Verbs

STRUCTURE: N/A

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PROCESS: 2.1.2., Plan Evaluation Materials

LEVEL OF AUTOMATION: Manual, Automated

DESCRIPTION: This process shall enable individuals to plan evaluation materials for one or more tasks by:

1. Obtaining, reviewing and analyzing task and behavioral objective information, and
2. Determining appropriate evaluation strategies and resource requirements.

Some of the task data required to accomplish this process shall be printed or reviewed on line. Other task-related data shall be obtained by reviewing task performance and proficiency data (publications), observing the workcenter environment (available resources, noise control, facility accommodations, etc.) and by interviewing workcenter personnel.

By considering evaluation parameters (task skill and knowledge requirements, task performance literacy requirements, etc.) and weighing factors (cost, time, fidelity and resource availability), an evaluation materials planner shall be able to determine the appropriate evaluation strategies (over-the-shoulder observation, knowledge testing, product evaluation, etc.) and resource requirements for evaluating persons on a given task.

DATA INPUT: Operational Environment Info
AFS Task Data
Publications
BO Data

DATA OUTPUT: Task Evaluation Strategy Info

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.2.1, Review/Analyze Task Info
- Process 2.1.2.2, Determine Evaluation Strategies & Resource Requirements.

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PROCESS: 2.1.2.1, Review/Analyze Task Info

LEVEL OF AUTOMATION: Automated, manual

DESCRIPTION: This process shall enable an evaluation materials planner to obtain information pertaining to a specific task, from which evaluation parameters will be derived. The evaluation parameters shall be used to determine evaluation strategies appropriate for the task.

The evaluation materials planner shall obtain specific task information by:

1. Reviewing task analysis data (references, activities, performance resources, weapon systems, etc.), either on line or once printed in hardcopy.
2. Reviewing behavioral objectives data, either on line or once printed in hardcopy.
3. Reviewing sources of task performance and proficiency (publications).
4. Observing the operational environment in which the task is performed.
5. Interviewing operational workcenter personnel.

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PROCESS: Review/Analyze Task Info (continued)

DESCRIPTION: (continued)

The collected information shall be analyzed to determine the evaluation parameters. Evaluation parameters shall include:

1. Task skill and knowledge requirements which must be evaluated,
2. Task performance literacy requirements (nomenclature) which must be evaluated,
3. Influencing environmental conditions which must be considered,
4. Task performance variance across work centers which must be estimated, and
5. Probability of change within work centers.

Once the evaluation parameters have been established, the evaluation planner shall use the information to determine the evaluation strategies most appropriate for the task and the resources which are required to accomplish the evaluation(s).

DATA INPUT: AFS Task Data
Operational Environment Info
Publications
BO Data

DATA OUTPUT: Task Evaluation Parameters

STRUCTURE: N/A

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PROCESS: 2.1.2.2, Determine Evaluation Strategies &
Resource Requirements

LEVEL OF AUTOMATION: Manual

DESCRIPTION: This process shall enable an evaluation materials planner to assess evaluation parameters and weighted factors applicable to a specific task in order to determine evaluation strategies most appropriate for the task.

The evaluation materials planner will assess the evaluation parameters derived from Process 2.1.2.1, Review/Analyze Task Info. The planner will also weigh factors such as cost, time, fidelity, resource availability and priority of the task.

The analysis of the parameters and weighted factors shall enable the planner to:

1. Select the evaluation strategies that are acceptable for evaluating the task,
2. Establish the resource requirements that apply to each selected evaluation strategy,
3. Compare the resource requirements to resource availability,
4. Rank the selected strategies,
5. Establish resource requirements for the evaluation strategies which shall be used to develop the evaluation materials.

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PROCESS: Determine Evaluation Strategies & Resource Requirements (continued)

DESCRIPTION: (continued)

The evaluation strategies determined from this process shall support the direct observation of airmen task performance for certification. In instances where direct observation of a task is difficult or cannot be performed, alternates to direct observation shall be specified. Adequate strategies with low resource requirements shall be given priority. Evaluation strategies shall include:

1. Over-the-shoulder observation,
2. Knowledge testing (true/false, multiple choice, matching, etc.),
3. Product evaluation,
4. Rigged (scenario),
5. Simulation,
6. Other.

DATA INPUT: Task Evaluation Parameters

DATA OUTPUT: Task Evaluation Strategy Info

STRUCTURE: N/A

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PROCESS: 2.1.3, Maintain Evaluation Materials

LEVEL OF AUTOMATION: Manual, Automated, Automatic

DESCRIPTION: This process shall enable evaluation materials developers to develop, revise, save, delete, review, print, analyze and validate evaluation materials. Evaluation materials include test items and tests.

DATA INPUT: AFS Task Data
Publications
Publication Change Notice
BO Data
Task Eval Strategy Info
Operational Feedback
Graphic(s)
Test Score Data

DATA OUTPUT: Test IDs
Test Item IDs
Test Data
Test Item Data
Test Item Analysis Keys
Graphic(s) ID(s)

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.1, Maintain Test Item Bank
- Process 2.1.2, Maintain Tests

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PROCESS: 2.1.3.1, Maintain Test Item Bank

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable test item developers and revisers to develop, list, revise, save, copy, delete, review and print test items; and thereby maintain the Test Item Bank. The Test Item Bank shall act as the central depository for all test item data.

For each test item, this process shall enable developing/revising of on-line text, specifying the test item references which apply, and coding the item to the respective knowledge or performance test(s) once one or more tests have been developed which incorporate the test item.

DATA INPUT: AFS Task Data
Publications
BO Data
Graphics
Task Evaluation Strategy Info
Test ID
Test Item Revision Requirement(s)
Publication Change Notice

DATA OUTPUT: Test Item IDs
Test Item Data

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.3.1, Develop/Revise Test Item
- Process 2.1.3.2, Specify Test Item References
- Process 2.1.3.3, Code Test Item to Test

The functions of list all test items for an objective, save an item, copy an item, delete an item, review an item and print an item are not covered in any further detail within this specification.

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PROCESS: 2.1.3.1.1, Develop/Revise Test Item

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test item developer or reviser to develop or revise a specific test item.

A test item shall be one of the following:

1. An Oral Test Guide (OTG), which contains instructions to the evaluator for administering a performance evaluation.
2. A Performance Evaluation Checklist (PEC), which is a checklist to be used by the evaluator when conducting a performance evaluation.
3. A knowledge test item, which is a question to be part of a knowledge test. A knowledge test item shall be one of the following type questions:
 - a. True/False
 - b. Multiple Choice
 - c. List Multiple Choice
 - d. Constructed response (fill-in-the-blank)
 - e. Touch
 - f. Touch Sequence
 - g. Matching

Based on task evaluation strategies and resource determinations for a given task (refer to Process 2.1.2.2), the test item developer/reviser shall be able to develop and revise one or more specific test items which will be incorporated into one or more tests to evaluate trainee's knowledge and/or performance of the task.

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PROCESS: Develop/Revise Test Item (continued)

DESCRIPTION: (continued)

Task analysis and behavioral objective data shall be used when developing or revising a test item. Test Item data shall be keyed, to make evident the association of data for a specific test item and to link the test item to the respective behavioral objective. Once a test item has been developed and saved it shall be assigned a Test Item ID; and added to the Test Item Bank, which is the central depository for all data for all test items developed using the AOTS. Based on changes in task performance and proficiency sources (publications), evaluation analysis which determined an item to be inadequate, or for other required reasons, a test item reviser shall be able to revise any portion or all of the data for a test item.

- To develop data for a new test item, the developer shall be able to either enter the complete test item data or copy another test item and modify the copied item's data.
- To develop data for a new test item, the developer shall be required to enter or select the respective Task ID, Subtask ID (if applicable) and Behavioral Objective ID for which the test item is being developed.
- To access an existing test item, the reviser shall be required, as a minimum, to enter or select the Test Item ID.
- Development/revision documentation (e.g., test item author, modification date) shall be automatically maintained by the system.

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PROCESS: Develop/Revise Test Item (continued)

DATA INPUT: AFS Task Data
BC Data
Publications
Task Evaluation Strategy Info
Graphics
Publication Change Notice
Test Item Revision Requirement(s)
Test Item

DATA OUTPUT: Test Item ID
Test Item

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.3.1.1, Develop/Revise OTG
- Process 2.1.3.1.2, Develop/Revise PEC
- Process 2.1.3.1.3, Develop/Revise Knowledge
Test Item

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PROCESS: 2.1.3.1.1.1, Develop/Revise OTG

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test item developer or reviser to develop or revise on-line data for an Oral Test Guide (OTG). An OTG shall contain instructions to the evaluator for administering a performance or product evaluation for a specific task or subtask. The OTG shall later be coupled with a Performance Evaluation Checklist (PEC) to develop a performance test (see Process 2.1.3.2.1, Develop/Revise Test). This process shall also automatically maintain test item development data.

The test item developer or reviser shall enter text for the OTG by keyboard input. A developer shall be able to copy another OTG and modify the copied OTG contents in order to create a new OTG. The system shall permit up to 5 screens (20 lines per screen) of data for each OTG. This process shall enable the test item developer/reviser to add, revise or delete data for any OTG for which he/she is authorized access. OTG data shall include:

1. Evaluator information (estimated time to accomplish evaluation; tools, equipment and materials required to accomplish evaluation, etc.), and
2. Specific evaluator instructions (how to administer the performance evaluation, what to say to the trainee, etc.).

A Test Item ID shall be automatically assigned once the OTG text has been developed and saved. OTG development and revision documentation (author, modification date, etc.) shall be automatically maintained by the system.

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PROCESS: Develop/Revise OTG (continued)

DESCRIPTION: (continued)

Evaluation strategies and resource availability determinations, task analysis data and behavioral objective data shall be reviewed and used when developing or revising an OTG.

Based on changes in task performance and proficiency sources (publications), evaluation analysis results which identify an OTG to be inadequate, or for other required reasons, a test item reviser shall be able to revise any portion or all of the data for the OTG.

DATA INPUT: AFS Task Data
BO Data
Publications
Task Evaluation Strategy Info
Publication Change Notice
Test Item Revision Requirement(s)
OTG

DATA OUTPUT: OTG
Test Item ID

STRUCTURE: N/A

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-PROCESS: 2.1.3.1.1.2, Develop/Revise PEC

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test item developer or reviser to develop or revise on-line data for a Performance Evaluation Checklist (PEC). The PEC is a checklist to be used by an evaluator when conducting a performance or product evaluation for a specific task/subtask. The PEC shall contain the steps which are performed by the trainee and observed by the evaluator. The PEC shall later be coupled with an Oral Test Guide (OTG) to create a performance test (see process 2.1.3.2.1, Develop/Revise Test). This process shall also automatically maintain test item development data.

A template shall be developed and automated which shall enable a PEC developer or reviser to enter text for each step of the PEC. The template shall support up to 60 performance steps for a PEC. At the developer's/reviser's request, the template shall be called up and the PEC developer or reviser shall be able to add, delete, or revise one or more steps. The steps of the PEC shall be automatically sequenced in numerical order, as steps are added and deleted from the PEC; upon request, the developer or reviser shall be able to reorder the PEC steps. When a performance test is printed which involves a PEC, space shall be provided and identified, beside each PEC step, for the observer to record his/her responses (yes, no, unobserved).

This process shall enable the developer/reviser to designate one or more PEC steps as critical. Critical steps not successfully performed shall cause a trainee to fail the evaluation. Designated critical steps shall be highlighted or identified in some other way.

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PROCESS: Develop/Revise PEC (continued)

DESCRIPTION: (continued)

A Test Item ID shall automatically be assigned once a PEC is developed and saved. PEC development and revision documentation (author, modification date, etc) shall be automatically maintained by the system.

Evaluation strategies and resource availability determinations, task analysis data and behavioral objective data shall be reviewed and used when developing or revising a PEC.

Based on changes in task performance and proficiency sources (publications), evaluation analysis results which identify a PEC to be inadequate, or for other required reasons, a test item reviser shall be able to revise any portion or all of the data for the PEC.

DATA INPUT: AFS Task Data
BO Data
Publications
Task Evaluation Strategy Info
Publication Change Notice
Test Item Revision Requirement(s)
PEC

DATA OUTPUT: PEC
Test Item ID

STRUCTURE: N/A

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PROCESS: 2.1.3.1.1.3, Develop/Revise Knowledge Test Item

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test item developer or reviser to develop or revise on-line data for a knowledge test item. This process shall automatically maintain test item development data (author, date last modified, etc.) for the item and enable the developer/reviser to playback the item.

A knowledge test item shall be incorporated into one or more knowledge tests. Because a knowledge test may be administered on line or off line, this process shall enable the developer/reviser to input data which supports on-line or off-line presentation of the test item.

A test item developer shall be able to develop a new knowledge test item by either entering all new data or by copying an existing knowledge test item and modifying the copied item's contents.

A knowledge test item shall be one of the following types:

1. True/False
2. Multiple Choice
3. List Multiple Choice
4. Constructed Response (fill-in-the-blank)
5. Touch
6. Touch sequence
7. Matching

The test item developer/reviser shall be able to input the following data for each knowledge test item:

1. Item stem
2. Graphics (optional)
3. Item alternative(s)
4. Item feedback

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PROCESS: Develop/Revise Knowledge Test Item (continued)

DESCRIPTION: (continued)

The item stem shall be entered by keyboard input, with text editing support provided by the system. This process shall permit up to two screens (20 lines per screen) for each item stem.

- Graphics shall be permitted for test items which are developed for on-line use only. Each graphic shall be considered as part of the item stem. Up to three graphics shall be permitted for a given test item. Once the test item developer provides the valid ID/name for a specific graphic, the graphic shall be automatically displayed. The test item developer/reviser shall be able to position, rotate, scale, and color the displayed graphic.

Capabilities shall be provided to enable the test item developer/revisor to input item alternatives. These capabilities shall also enable the developer/reviser to flag (code) the correct alternative(s), so scoring and analysis for the item can occur.

Capabilities to provide feedback shall be permitted for all types of knowledge test items.

Evaluation strategies and resource availability determinations, task analysis data and behavioral objective data shall be reviewed and used when developing or revising a knowledge test item.

A Test Item ID shall be automatically assigned once data for a knowledge test item has been developed and saved. Test item development and revision data (author, modification date, etc.) shall be automatically maintained by the system.

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PROCESS: Develop/Revise Knowledge Test Item (continued)

DESCRIPTION: (continued)

Based on changes in task performance and proficiency sources (publications), evaluation analysis results which identify a knowledge test item to be inadequate, or for other required reasons, a test item reviser shall be able to revise any portion or all of the data for the item.

DATA INPUT: AFS Task Data
BO Data
Publications
Task Evaluation Strategy Info
Graphic(s)
Publication Change Notice
Test Item Revision Requirement(s)
Knowledge Test Item

DATA OUTPUT: Graphic(s) ID(s)
Knowledge Test Item
Test Item ID

STRUCTURE: N/A

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PROCESS: 2.1.3.1.2, Specify Test Item References
(Publications)

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test item developer or reviser to specify the task performance and proficiency references (publications) which pertain to a given test item. This process involves two functions:

1. Identifying the task/subtask publications which apply to the test item, and
2. Specifying the publication breakdowns which apply to the test item.

The developer/reviser shall identify the test item references based on the references that have been defined for the behavioral objective to which the test item applies. Upon the user's request, the system shall automatically display the objective references. The developer/reviser shall be able to select and de-select one or more of the references displayed. Selected references shall be automatically highlighted or identified in some other way. This process shall not permit a test item developer or reviser to add a reference that has not already been identified as a reference for the respective behavioral objective.

Once the test item publications have been identified, the developer/reviser shall be able to list the breakdowns (paragraphs, chapters, tables, etc.) which apply to any of the identified publications. Each breakdown shall be entered by keyboard input. Developers/revisers shall be able add or delete breakdowns to or from the list.

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PROCESS: Specify Test Item References (continued)

DESCRIPTION: (continued)

Based on changes in task performance and proficiency sources (publications) identified by the Management Subsystem, a test item reviser shall be able to re-specify any one, or all, of the test item references or breakdowns.

DATA INPUT: BO References
Publications
Publication Change Notice
Test Item References

DATA OUTPUT: Test Item References

STRUCTURE: N/A

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PROCESS: 2.1.3.1.3, Code Test Item To Test

LEVEL OF AUTOMATION: Automatic

DESCRIPTION: This process shall automatically link a given test item (PEC, OTG or knowledge test item) to the performance or knowledge test(s) which incorporate the test item.

Each time a test is developed or revised, the Test ID shall be automatically linked (coded) to each test item incorporated within the test. Performance Test IDs shall be coded to OTGs and PECs; while knowledge Test IDs shall be coded to knowledge test items. This coding shall enable:

1. Correct test item presentation for a given performance or knowledge test at the time the test is printed for off-line use or administered on line.
2. Evaluation analysis to be performed for a given test item.

DATA INPUT: Test Id

DATA OUTPUT: Test Id

STRUCTURE: N/A

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PROCESS: 2.1.3.2, Maintain Tests

LEVEL OF AUTOMATION: Automated, Automatic, Manual

DESCRIPTION: This process shall enable test developers/revisers to develop, revise, review, print and delete tests. Two types of tests shall be maintained:

1. Knowledge tests, which shall be used for measuring trainee's task/subtask knowledge, and
2. Performance tests, which shall be used for measuring trainee's task/subtask performance or end products.

Knowledge tests shall be developed for on-line or off-line administration; and shall support pre-training and post-training evaluations. Performance tests shall be developed for off-line administration; and shall support pre-training, post-training and Quality Control evaluations.

This process shall also enable test developers/revisers to analyze and validate evaluation materials.

DATA INPUT: AFS Task Data
Publications
BO Data
Test Item Data
Task Evaluation Strategy Info
Publication Change Notice
Operational Feedback
Test Score Data

DATA OUTPUT: Test IDs
Test Data
Test Data for Event Scheduling
Test Item Revision Requirement(s)

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PROCESS: Maintain Tests (continued)

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.3.2.1, Develop/Revise Test
- Process 2.1.3.2.2, Analyze Evaluation Materials
- Process 2.1.3.2.3, Validate Evaluation Materials

NOTE: No further details are provided within this specification for the functions of saving, deleting, reviewing and printing tests.

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PROCESS: 2.1.3.2.1, Develop/Revise Test

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test developer to develop or revise a test on line. Capabilities shall exist to permit the development of either a knowledge or performance test.

- A knowledge test shall: consist of one or more knowledge test items (true/false, multiple choice, etc.); be developed for on-line and/or off-line administration; and support pre-training or post-training evaluation for an AFS task or subtask.
- A performance test shall: consist of one or more Oral Test Guides (OTGs) and one or more Performance Evaluation Checklists (PECs); be developed for off-line administration; and support pre-training or post-training evaluation for an AFS task or subtask, or Quality Control evaluation.

This process shall involve the following:

1. Identifying the objectives for which the test is being developed and the test items to be incorporated into the test,
2. Formatting the test,
3. Establishing test parameters,
4. Developing on-line and/or off-line instructions for taking the test (knowledge test only), and
5. Maintaining test modification data.

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PROCESS: Develop/Revise Test (continued)

DESCRIPTION: (continued)

A test developer/reviser shall consider evaluation strategies, resource availability, task analysis data (activities, skills and knowledges, etc.) and behavioral objective data when developing or revising a test. These data will help in identifying the type of test to develop and the most appropriate test items for the test. Each test shall be keyed either to a terminal or supporting objective. When a new test is developed a test number shall be automatically assigned. This numbered Test ID shall be used to distinguish the test from other tests developed for the objective and to associate the test items to the test.

Based on changes in task performance and proficiency sources (publications), evaluation analysis which determine a test to be inadequate, or other reasons, a test reviser shall be able to revise any portion or all of the data for a test.

Test development and modification data (author, date last modified, etc.) shall be automatically maintained. The original test developer's name and initial test development date shall be maintained until the test is deleted. Each time objective/test item selection, test format, test parameters or test instructions data are revised for a test, the test reviser's name and the modification date shall be updated.

DATA INPUT: AFS Task Data
Publications
BO Data
Test Data
Test Item Data
Task Evaluation Strategy Info
Test Revision Requirement(s)

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PROCESS: Develop/Revise Test (continued)

DATA OUTPUT: Test ID
Test Data
Test Data for Event Scheduling

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.3.2.1.1, Select Objectives and Test Items
- Process 2.1.3.2.1.2, Input Test Format
- Process 2.1.3.2.1.3, Input Test Parameters
- Process 2.1.3.2.1.4, Input Knowledge Test Instructions

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PROCESS: 2.1.3.2.1.1, Select Objectives and Test Items

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test developer or reviser to select the behavioral objective(s) and test items for a test being developed or revised.

Each test shall be keyed to a terminal (task) or a supporting (subtask) objective. Once a test has been keyed to a particular behavioral objective, the test developer shall be able to:

1. Select and include test items applicable to the keyed objective, and
2. Select any other objective existing for the task; and select and include any test items which apply to that objective.

This process shall enable the evaluation of more than one subtask at a time; or the evaluation of an entire task when the task has been broken down into subtasks and it has been determined that an evaluation shall not occur for each subtask.

Before a test item can be selected for a given objective, the test item must first reside in the Test Item Bank. Capabilities shall be provided to support the selection of appropriate types of test items for a given test.

- At least one OTG and one PEC must be selected for the development of a performance test.
- At least one knowledge test item must be selected for the development of a knowledge test.

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PROCESS: Select Objectives and Test Items (continued)

DESCRIPTION: (continued)

For a each selected objective for a performance test:

1. All test items (OTGs and PECs) maintained in the Test Item Bank for the objective shall be automatically called up; the system shall display the Test Item Id for each test item.
2. The test developer shall be able to review each test item and/or select those test items to be incorporated into the test.
3. Highlighting, or some other identifiable means, shall be used to designate each test item selected to be incorporated into the test.

For each selected objective for a knowledge test, the test developer shall be able to:

1. Review/select specific knowledge test items,
2. Review/select all knowledge test items,
3. Select a random number of knowledge test items, or
4. Select random presentation of test items.

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PROCESS: Select Objectives and Test Items (continued)

DESCRIPTION: (continued)

When the test developer elects specific test items or all test items: all knowledge test items maintained in the Test Item Bank for the selected objective shall be automatically called up; the system shall display the Test Item ID that applies to each test item. The test developer shall be able to select one or more of the test items which have been called up, and may review each test item whether or not the item is selected for the test. Highlighting, or some other identifiable means, shall be used to designate each item that is selected to be incorporated into the test.

When the test developer elects a random number of knowledge test items: the system shall automatically select the random test items based on the number of test items the test developer defines for the test and the total knowledge test items maintained in the Test Item Bank for the selected objective. The system shall display the Test Item ID of each selected test item. The test developer shall be able to review/accept the randomly selected items, or de-select one or more items and select other items maintained for that objective.

When the test developer elects to randomly select test items at time of presentation: the system shall randomly select the test items at the point in time when the test is either administered on line (Process 2.2.1) or printed for off-line administration (Process 2.2.2). The number of items randomly selected shall be based on the number of test items the test developer defines for the test and the total test test items maintained in the Test Item Bank for the selected objective.

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PROCESS: Select Objectives and Test Items (continued)

DESCRIPTION: (continued)

Once a test is developed, a test reviser shall be able to:

1. Review the list of selected objectives,
2. Review the list of selected test items for each objective,
3. Review each selected test item,
4. De-select any test item previously selected,
5. De-select any objective previously selected (which will cause the respective selected test items to be automatically deleted), or
6. Select additional objectives and/or test items.

NOTE: These capabilities for revising a test shall not apply for a knowledge test when the test items are randomly selected at time of presentation.

DATA INPUT: AFS Task Data
BO Data
Test Item Data
Selected Objectives & Test Items
Task Evaluation Strategy Info

DATA OUTPUT: Selected Objectives & Test Items

STRUCTURE: N/A

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PROCESS: 2.1.3.2.1.2, Input Test Format

LEVEL OF AUTOMATION: Automated, automatic

DESCRIPTION: This process shall enable a test developer/reviser to format a test. The format of the test reflects the order in which the test items will be presented when the test is administered.

A test shall be automatically formatted as test items are selected when developing/revising the test. The test items shall be ordered in the sequence selected. The test developer or reviser shall be able to accept the automatic format or re-order the test items to achieve the desired format.

In addition to reordering test items, this process shall also enable a test developer/reviser to designate critical knowledge test items. Critical knowledge test items are items that are considered essential to task competency; if a trainee incorrectly responds to a critical knowledge test item, the entire knowledge test is failed. Critical knowledge test items shall be highlighted or identified in some other way.

DATA INPUT: Test Format Data

DATA OUTPUT: Test Format Data

STRUCTURE: N/A

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PROCESS: 2.1.3.2.1.3, Input Test Parameters

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test developer or reviser to manipulate the following three test parameters for a performance test:

1. test use
2. item analysis
3. maximum analysis samples.

The process shall enable a test developer/reviser to manipulate the following seven test parameters for a knowledge test:

1. time allowed
2. test use
3. item analysis
4. maximum analysis samples
5. item scrambling
6. test interruption (on line only)
7. test item recap (on line only)

The parameters shall be defined, as follows:

Time Allowed: The test developer/reviser may set a maximum time limit in minutes for the test taker to complete the test on line. The default setting shall be 60 minutes; however, the developer may set any limit between 1 and 1440 minutes.

Test Use: The test developer/reviser may designate a performance or knowledge test as being the primary test of its type or an alternate test. Primary shall be the default setting for the first test of its type (performance or knowledge) that is developed for a behavioral objective. Alternate shall be the default setting for each test subsequently developed for the same objective.

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PROCESS: Input Test Parameters (continued)

DESCRIPTION (continued)

Item Analysis: The test developer/reviser may enable or disable the item analysis option. Enabled shall be the default setting. When item analysis is enabled, the test item analysis process (2.1.3.2.2) shall run automatically whenever the specified number of samples of data have been accumulated. (NOTE: The item analysis function must be disabled before the test developer shall be able to invoke the Select Random Items at Presentation option in the selection of knowledge test items.)

Maximum Analysis Samples: The test developer or reviser may specify the maximum number of test samples to be stored for analysis. The test developer/reviser may select any number from 30 to 100. The default setting shall be 50.

Item Scrambling: The test developer/reviser may designate whether the test items are to be presented to the test-taker in the order displayed in the test format or are to be automatically scrambled for presentation. The default setting shall be disabled.

Test Interruption: The test developer/reviser may determine whether a test-taker, continuing to take an on-line test after an interruption of 15 minutes or more, shall be permitted to review test items and change responses to items presented prior to the interruption. The default setting shall be allowed. When an interruption is less than 15 minutes, review and changing of responses shall always be allowed.

Test Item Recap: The test developer/reviser may determine whether the test-taker, taking a test online, shall be allowed a recapitulation of the items that were incorrectly answered on the test. The default setting shall be allowed.

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PROCESS: Input Test Parameters (continued)

DATA INPUT: Test Parameter Data

DATA OUTPUT: Test Parameter Data

STRUCTURE: N/A

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PROCESS: 2.1.3.2.1.4, Input Knowledge Test Instructions

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a test developer or reviser to input and revise knowledge test instructions.

Test instruction templates shall be developed and automated and shall consist of general instructions for taking a knowledge test. A test developer or reviser shall be able to add, revise or delete data to accommodate instructions for each specific knowledge test.

There shall be two knowledge test instruction templates; one for on-line testing, the other for off-line testing. The test developer shall indicate whether the test is to be administered only on line, or both on line and off line. The template(s) corresponding to the test developer's decision shall be automatically called up for editing.

DATA INPUT: Knowledge Test Instructions

DATA OUTPUT: Knowledge Test Instructions

STRUCTURE: N/A

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PROCESS: 2.1.3.2.2, Analyze Evaluation Materials

LEVEL OF AUTOMATION: Automatic, automated

DESCRIPTION: This automatic process shall enable:

1. Automatic consolidation of specific test, test item and test score results data.
2. Automatic sorting of consolidated data by test, objective, subtask and task.
3. Automatic, or as requested, analysis of consolidated/sorted data.
4. Automatic reporting of the evaluation analysis results.

DATA INPUT: Test Item Analysis Data
Test Analysis Data
Test Score Data

DATA OUTPUT: Test Item Evaluation (TIE) Report

STRUCTURE: This process includes the following subprocesses:

- Process 2.1.3.3.1, Consolidate Test/Test Item Analysis Data
- Process 2.1.3.3.2, Perform Test/Test Item Analysis

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PROCESS: 2.1.3.2.2.1, Consolidate Test/Test Item Analysis Data

LEVEL OF AUTOMATION: Automatic

DESCRIPTION: This automatic process shall consolidate all data required for performing an analysis of tests and test items. Data to be analyzed result from a variety of processes:

1. As each test item is developed or revised, the appropriate test item analysis data (test item ID, correct answer, etc) shall be automatically stored for future analysis.
2. As each test is developed or revised, the appropriate test analysis data (Test ID, test format, etc.) shall be automatically stored for future analysis purposes.
3. As each test is administered and scored, the trainee's responses and overall test results (pass/fail) shall be automatically stored for future analysis.

Test/Test Item analysis data shall be consolidated to support either of the following:

1. Automatic analysis of a test and its items, once thirty samples of the test have been scored, or
2. Analysis of a test and its items based on a test developer's request to perform the analysis. (Data for all samples, up to the maximum number specified in the test format, shall be consolidated.)

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PROCESS: Consolidate Test/Test Item Analysis Data
(continued)

DESCRIPTION: (continued)

At periodic intervals (each time the final task lists are stored - Process 1.1.1.3.6 of the Management Subsystem) the system shall automatically consolidate and sort identification data pertaining to each test. This process shall produce a key which aligns test identification data for all objectives; the key shall enable a test analyzer to input specific data to initiate an analysis for any test listed.

DATA INPUT: Test Analysis Data
Test Item Analysis Data
Test Score Data
Test Analysis Request Data

DATA OUTPUT: Consolidated Analysis Data
Test Item Analysis Key

STRUCTURE: N/A

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PROCESS: 2.1.3.2.2.2, Perform Test/Test Item Analysis

LEVEL OF AUTOMATION: Automatic, automated

DESCRIPTION: This process shall enable independent analysis of any test residing in the system. This process shall: extract the appropriate consolidated analysis data needed to analyze a specific test; calculate statistical data; and generate a document which reports the analyzed data.

This process shall be accomplished in one of two ways:

1. When the minimum number of test samples have been consolidated for a particular test, or
2. When a test developer submits an on-line request for an analysis of a particular test.

The minimum number of test samples required for each test to be automatically analyzed shall be established as thirty. Once thirty samples of a given test have been consolidated, the system shall calculate the consolidated data and produce a report which summarizes the analysis results.

A test analyzer shall be able to request an analysis of a particular test, at any time, using keyed test identification data and specifying one or more of the following selection criteria:

1. All samples of the test during a specified timeframe,
2. All samples of the test which have been failed,
3. All samples of the test which have been passed,
4. All samples of the test.

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Process: Perform Test/Test Item Analysis (continued)

Description: (continued)

Once the test analyzer has input the test identification data (from the key), and entered one or more of the item analysis selection criteria, the system shall automatically calculate the consolidated data and produce a report which summarizes the analysis results.

This process shall generate a document that reports test, subscale (objective) and test item analysis results. To obtain further information regarding the types of analysis results which are reported, refer to the description of the data flow titled: Test Item Evaluation (TIE) Report.

DATA INPUT: Test Item Analysis Keys
Consolidated Analysis Data

DATA OUTPUT: Test Analysis Request Data
Test Item Evaluation (TIE) Report

STRUCTURE: N/A

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PROCESS: 2.1.3.2.3, Validate Evaluation Materials

LEVEL OF AUTOMATION: Manual

DESCRIPTION: This off-line process shall enable a test developer to validate evaluation materials against a criterion of job performance in an operational setting IAW Air Force Instructional Systems Development (ISD) policy.

This process shall provide for identification of: changes in operational requirements, changes in task performance and proficiency documentation (publications), and test/test item analysis results, which warrant review and possible revision of existing task (or subtask) evaluation materials.

The test developer shall apply subject matter expertise and knowledge of ISD principles and procedures in order to make an informed judgment concerning the adequacy of a particular test and test items. The developer shall determine whether the test(s) for a particular behavioral objective is/are adequate to measure the competency of the trainee's knowledge, skill and performance capabilities for a given subtask or task.

When this process is performed, each test and its test items shall be scrutinized with respect to the following concerns:

1. Technical accuracy (does the test contain only accurate technical data);
2. Technical adequacy/validity (are the right questions being asked; are the right performance steps being observed);
3. Discrimination (does the item differentiate between airmen who have mastered the objective and airmen who have not);

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Process: Validate Evaluation Materials (continued)

Description: (continued)

4. Format (are the test and item format consistent with accepted evaluation procedures);
5. Instructions (are the instructions clear and concise);
6. Time (is sufficient time allowed to complete the test);
7. Reliability (all things being equal, will the same results be obtained each time the test/item is presented to the same individual).

If any of the representative skills or knowledge for task performance are not adequately tested by one or more test items, the development of additional tests and/or test items or the revision of tests/test items shall be indicated.

DATA INPUT: AFS Task Data
Publications
BO Data
Test Data
Test Item Data
Task Evaluation Strategy Info
Test Item Evaluation (TIE) Report
Operational Feedback
Publication Change Notice

DATA OUTPUT: Test Revision Requirement(s)
Test Item Revision Requirement(s)

STRUCTURE: N/A

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20.2.1 Evaluation Instrument Management Component Data Flows.

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DATA FLOW: AFS Task Data

DESCRIPTION: An aggregation of task record data for a specific task. The data result from a task analysis and are updated on line, via processes within the Management Subsystem. These data shall be available for on-line review or may be printed. AFS task data shall be reviewed and used to:

- Develop/revise one or more behavioral objectives for the task and its subtasks (if subtasks exist),
- Plan evaluation materials for the task,
- Develop/revise test items and tests which shall be used to evaluate trainees knowledge and performance capabilities regarding the task, and
- Validate each test (and the respective test items) administered and scored for the task.

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.1, Process 1, 2, 3
 DFD 2.1.1, Process 1, 2
 DFD 2.1.2, Process 1
 DFD 2.1.3, Process 1, 2
 DFD 2.1.3.1, Process 1
 DFD 2.1.3.1.1, Process 1, 2, 3
 DFD 2.1.3.2, Process 1, 3
 DFD 2.1.3.2.1, Process 1

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DATA FLOW: AFS Task Data (continued)

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
AFSC	The Air Force Specialty Code for which the task applies. AFSCs are identified by an alphanumeric string; the basic AFSC is identified by a string of five numerals; however, an AFSC may have an alpha prefix and/or a numerical suffix. Data Type: alpha/numeric string 5-7 characters.
AOTS Task ID	The code that uniquely identifies the task from other tasks in the AFSC. The first digit is always alphabetical (a-z) and represents the task category for which the task applies. The last five digits are always numerical (00000-99999). Data Type: Alpha/numeric string of 6 characters.
Task Version	A numeric identification of the version of the task. (The version number shall increase by one each time an AOTS software installation occurs if certain data for the task has been modified since the last installation.) Data Type: Integer (up to 2 digits).
Subtask IDs	The numeric identifications of each subtask applicable to the task. (Subtasks are numbered automatically and consecutively; up to 25 subtasks may exist for the task.) Data Type: Integer (range 1-25).

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DATA FLOW: AFS Task Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
AOTS Task Statement	Statement which reflects what must be accomplished. May be identical to an OSR statement, a revision of an OSR statement, or a statement created by a Subject Matter Expert (SME). The task statement shall contain an active verb and an object. Data Type: Alpha/numeric string, not to exceed 240 characters/spaces.
Weapon Systems/ Equipment Supported	Name of the weapon systems/equipment that the task is performed on (RF-4C aircraft, J79-15 engine, etc.). Data Type: Array (1-X system/equipment names).
Other Systems Data	
- Other System Names	Name of each automated system, such as CAMS, for which data/automated processes exist for the task. Data Type: Array (1-X names).
- Other System Task	Identification characters used in the other automated systems for the task. Data Type: Array (1-X IDs).
Corresponding STS	A cross-reference depicting one or more Specialty Training Standard (STS) in which the task is listed. Data Type: Array (1-X STSs)

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DATA FLOW: AFS Task Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Task References	Titles, identification codes, and breakdowns of the publications that specify performance and proficiency requirements for the task. Data Type: Array (1-X references); Array (1-X breakdowns).
Performance Resources	Listing of resources (tools, equipment, and materials) required for satisfactory task performance. Data Type: Array (1-X resources).
Prerequisite Tasks	Task IDs of tasks that must be accomplished prior to or in conjunction with the task under consideration. Data Type: Array (1-X tasks).
Task Performance Location(s)	Alpha/numerically coded identification of the location(s) -- base, unit, and workcenter -- at which the task is performed. Data Type: Array (1-X bases); Array (1-X units); Array (1-X workcenters).
Supporting Knowledge and Skills	Listing of the prerequisite knowledge and skills for satisfactory task performance. Data Type: Array (1-X knowledge/skills)
Task/Subtask Activities	The actions or steps (usually but not necessarily sequential) required for satisfactory task performance. Data Type: Array (1-X activities).

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DATA FLOW: Bad Verbs

DESCRIPTION: Unacceptable (inactive) verbs which are automatically matched against the verb in each newly developed or revised behavioral objective statement. Bad verbs (up to 100) shall reside on a list; each verb shall be examined and matched to each BO statement under development/revision. When a BO statement verb matches a bad verb, the statement shall be rejected and the BO developer or reviser shall be required to reenter an acceptable verb for the BO statement.

DATA SOURCE: DFD 2.1, Process 1 and Data Store E2
 DFD 2.1.1, Process 3 and Data Store E2
 DFD 2.1.1.1, Data Store E2

DATA DESTINATION: DFD 2.1, Data Store E2 and Process 1
 DFD 2.1.1, Data Store E2 and Process 1, 2, 3
 DFD 2.1.1.1, Process 2

STRUCTURE: N/A. Data Type: Array (1-X bad verbs), where X cannot exceed 100. Each bad verb within the array is an alpha string, not to exceed 20 characters/spaces.

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DATA FLOW: BO (Behavioral Objective) Data

DESCRIPTION: Data which have been developed or revised for a given behavioral objective. A comprehensive behavioral objective shall consist of a complete behavioral objective statement; the references (publications and publications breakdowns) which set forth task performance and proficiency requirements for the objective; the resources (performance, training and evaluator) required for satisfactory accomplishment of the objective; and a list of the training materials which apply to the objective.

DATA SOURCE: DFD 2.1, Process 1 and Data Store E1
DFD 2.1.1, Process 1 and Data Store E1
DFD 2.1.2, Data Store E1
DFD 2.1.3, Data Store E1
DFD 2.1.3.1, Data Store E1
DFD 2.1.3.1.1, Data Store E1
DFD 2.1.3.2, Data Store E1
DFD 2.1.3.2.1, Data Store E1

DATA DESTINATION: DFD 2.1, Data Store E1 and Process 1,2,3
DFD 2.1.1, Data Store E1 and Process 2
DFD 2.1.2, Process 1
DFD 2.1.3, Process 1,2
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 1, 2, 3
DFD 2.1.3.2, Process 1, 3
DFD 2.1.3.2.1, Process 1

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DATA FLOW: BO Data (continued)

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Objective ID	<p>A unique number identifying the particular behavioral objective for which the data applies. This ID is automatically assigned by the system once the BO statement is developed, and cannot be revised.</p> <p>Data Type: Integer (number is limited only by system's capacity for relative records per file).</p>

Complete Behavioral Objective Statement

- | | |
|------------------------|--|
| - Behavioral Component | A brief statement headed by an active verb that specifies the required behavior. |
| - Conditions Component | The operational conditions under which the required behavior will normally occur. |
| - Standards Component | A measurable minimum level of performance that shall be considered to demonstrate an acceptable level of competency. |

Data Type for complete statement:
alpha/numeric string, not to exceed 240
characters/spaces.

Page 3 of 3

DATA FLOW: BO Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
BO References Data	
- Publications	Publications listed by identification code and and title that define the performance and proficiency requirements for the objective. Data Type: Array (1-X publication IDs/titles; where X cannot exceed 6).
- Breakdowns	Breakdowns (by section, chapter, figure, table, page, or other part) of the publications that define the performance and proficiency requirements for the objective. Data Type: Array (1-X breakdowns; where X cannot exceed 100).
BO Resources	List of tools, equipment and material required for successful performance of the objective (called performance resources), as well as the training and evaluator resources required to accomplish the objective. Data Type: Array (1-X performance resources); Array (1-X evaluator resources); Array (1-X training resources); where X cannot exceed 30.
BO Training Materials	List of training materials which exist for accomplishing the objective. These materials can be of many types: Computer Assisted Instruction (CAI) lessons, films, sound-on-slide presentations, etc. Data for each material includes: Name of item, type of item and other identification data (course ID, film number/ID, etc.) Data Type: Array (1-X materials), where X cannot exceed 15.

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Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: BO Data for Event Scheduling

DESCRIPTION: Data applying to a particular behavioral objective, which is passed to the Management Subsystem to enable the scheduling of a training or evaluation event. These data shall support either a task knowledge training or evaluation event; a task performance training or evaluation event; or a Quality Control (QC) evaluation event.

DATA SOURCE: DFD 2.1, Data Store E1
DFD 2.1.1, Data Store E1

DATA DESTINATION: External Entity 1.3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Objective ID	A unique number identifying the particular behavioral objective for which the BO data applies. This ID is automatically assigned by the system once the BO statement is developed. Data Type: Integer (number is limited only by system's capacity for relative records per file).
BO Resources	The performance and training or evaluator resources which have been specified for the objective. Data Type: Array (1-X performance resource names and descriptions); Array (1-X training or evaluator resource names and descriptions); where X cannot exceed 30.

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Date: 31 October 1989

DATA FLOW: BO ID

DESCRIPTION: A unique identification number assigned by the system to a particular behavioral objective, once the respective BO statement has been developed. Each BO ID shall be used to key (link):

- Data for a given behavioral objective (i.e., BO statement, references, resources and training materials),
- The behavioral objective to the respective task or subtask,
- The behavioral objective to each test and test item which is developed for evaluating the accomplishment of the objective.

DATA SOURCE: DFD 2.1., Process 1
DFD 2.1.1, Process 1
DFD 2.1.1.1, Process 2

DATA DESTINATION: DFD 2.1, External Entity 1.1 and 1.3
DFD 2.1.1, External Entity 1.1 and 1.3
DFD 2.1.1.1, External Entity 1.1 and 1.3 and Data Store E1

STRUCTURE: N/A. Data Type: Integer (number is limited only by system's capacity for relative records per file).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: BO References

DESCRIPTION: Official publications and the breakdowns (by section, chapter, paragraph, table, page number, etc.) that define the performance and proficiency requirements for a given behavioral objective. BO references may only be selected from the respective task/subtask references, and BO reference breakdowns shall apply only to the selected BO references. BO references shall be used to select respective test item references.

DATA SOURCE: DFD 2.1.1.1, Process 3
DFD 2.1.3.1, Data Store E1

DATA DESTINATION: DFD 2.1.1.1, Data Store E1
DFD 2.1.3.1, Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Selected References	Publications, listed by identification code and title, that have been selected from the task/subtask references; thereby designating them as the BO references. Data Type: Array (1-X reference names and titles), where X cannot exceed 6.
Reference Breakdowns	Breakdowns (by section, chapter, figure, table, page, or other part) of a publication that define the performance and proficiency requirements for the objective. Data Type: Array (1-X breakdowns), where X cannot exceed 100.

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DATA FLOW: BO Resources

DESCRIPTION: The resources which apply to a given behavioral objective. These resources shall include:

- Performance resources (tools, equipment and materials) which are required for accomplishing the object. The BO performance resources shall be selected from those resources identified for the task or subtask to which the BO applies; thereby designating them as the BO performance resources.
- Training resources (slide projector, chalkboard, etc.) which are required when training someone to accomplish the objective.
- Evaluator resources (stopwatch, clipboard) which are required to evaluate someone accomplishing the objective.

DATA SOURCE: DFD 2.1.1.1, Process 4

DATA DESTINATION: DFD 2.1.1.1, Data Store E1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
BO Performance Resources	A list of performance resources identified for the behavioral objective. Data Type: Array (1-X resource names and descriptions), where X cannot exceed 30.
BO Training Resources	A list of training resources identified for the behavioral objective. Data Type: Array (1-X resource names and descriptions), where X cannot exceed 30.

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DATA FLOW: BO Resources (continued)

STRUCTURE: (continued)

Data Items

Descriptions

BO Evaluator Resources	A list of evaluator resources identified for the behavioral objective. Data Type: Array (1-X resource names and descriptions), where X cannot exceed 30.
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Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: BO Training Materials

DESCRIPTION: Training materials (Computer Assisted Instruction lessons, publications, filmstrips, audio tapes, etc.) that apply to a given behavioral objective. The maximum number of training materials per objective is 15.

DATA SOURCE: DFD 2.1.1.1, Process 5

DATA DESTINATION: DFD 2.1.1.1, Data Store E1

STRUCTURE: Data elements shall include (for each material listed for the behavioral objective):

<u>Data Item</u>	<u>Description</u>
Type of Training Material	Data which identifies the training material type. The type shall be one of the following: C=CAI lesson, T=Text, F=film, S=Sound-on-Slide, and O=Other. Data Type: Alpha string of 1 character.
Training Material ID	Data identifying the training material. This shall be a CAI lesson number, a training handbook number, etc. Data Type: Alpha/numeric string, not to exceed 16 characters/spaces.
Training Material Description	Data describing the training material, such as the name of a film, the title of a CAI lesson, etc. Data Type: Alpha/numeric string, not to exceed 50 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Complete BO Statement

DESCRIPTION: A complete behavioral objective statement consisting of the behavior, the conditions under which the objective will be performed, and the minimum standards for satisfactory performance. The statement components (behavior, conditions and standards) may be developed separately and automatically combined to form the complete BO statement, or the complete BO statement may be developed in one step.

DATA SOURCE: DFD 2.1.1.1, Process 2

DATA DESTINATION: DFD 2.1.1.1, Data Store E1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Behavioral Component	A brief statement containing an active verb and an object that specifies the required behavior. Data Type: Alpha/numeric string, not to exceed 80 characters/spaces.
Conditions Component	The operational conditions under which the required behavior will normally occur. Data Type: Alpha/numeric string, not to exceed 80 characters/spaces.
Standards Component	A measurable minimum level of performance that shall be considered to demonstrate an acceptable level of performance. Data Type: Alpha/numeric string, not to exceed 80 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Consolidated Analysis Data

DESCRIPTION: A consolidation of test analysis data, test item analysis data and test score data applicable to a given test. Data for each sample of the test is consolidated, up to the designated maximum of samples for the test. These data shall be used, along with automated algorithms, to perform an analysis of the test and its items.

DATA SOURCE: DFD 2.1.3.2.2, Process 1

DATA DESTINATION: DFD 2.1.3.2.2, Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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See data items/descriptions for Data Flows: Test Analysis Data, Test Item Analysis Data and Test Score Data. This data flow is an aggregation of these three data flows.	
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Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Graphic(s)

DESCRIPTION: One or more developed on-line graphics which are used as part of the stem for a specific knowledge test item. Up to three graphics can be used for any knowledge test item. Once displayed to the test item developer/reviser, a graphic may be sized, colored, rotated or moved on the screen to enable desired presentation of the test item stem.

DATA SOURCE: External Entity 5.1

DATA DESTINATION: DFD 2.1, Process 3
DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 3

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Graphic	Each actual graphic identified by the developer for the knowledge test item.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Graphic(s) ID(s)

DESCRPTION: The alphanumeric name(s) or code(s) identifying one or more graphics to be included in a given knowledge test item. Each ID is specified by a test item developer/reviser and is passed to the Training Development Component to display the respective graphic when accomplishing test item development/revision.

DATA SOURCE: DFD 2.1. Process 3
DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 3

DATA DESTINATION: External Entity 5.1

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Graphic ID	Each graphic name/code identified by the developer or reviser for the knowledge test item (maximum IDs per test item is 3). Data Type: Alpha/numeric string, not to exceed 10 characters/spaces.

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DATA FLOW: Knowledge Test Instructions

DESCRIPTION: Instructions to an examinee for taking a specific knowledge test on line, off line or both on line and off line. Once developed, these instructions shall be stored with other test data being maintained on line; any or all of the instructions may be revised as deemed necessary.

DATA SOURCE: DFD 2.1.3.2.1, Process 4 and Data Store E4

DATA DESTINATION: DFD 2.1.3.2.1, Data Store E4 and Process 4

STRUCTURE: If the test is developed for on-line use, only on-line instructions will be developed/revised; for off line use, only off line instructions; for both on line and off line use, both sets of instructions.

Data Type for each set of instructions:
Alpha/numeric string, not to exceed 3600
characters/spaces. Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Purpose	Text that states the purpose for the knowledge test, which shall include the task/subtask to which the test is relevant. (applies whether on line or off line)

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DATA FLOW: Knowledge Test Instructions (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Testing Procedures	<p>Text that states how to take the test, either on line or off line.</p> <ul style="list-style-type: none">- On-line procedures shall include how to select the correct answer(s), mark questions for review, skip questions and review questions once presented.- Off-line procedures shall include what type of pencil to use, how to fill out the respective answer sheet, how to record responses and what to do with the evaluation materials (test copy and answer sheet) when the examinee finishes the test.

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DATA FLOW: Knowledge Test Item

DESCRIPTION: A specific knowledge test item under development or revision. The knowledge test item shall consist of the item stem (including graphics), response alternatives, designated correct answer(s), and feedback comments. (For some types of items, feedback may only be provided for an incorrect response). Once developed, the knowledge test item shall be stored with other test items which are being maintained on line; the test item may be revised as deemed necessary.

DATA SOURCE: - DFD 2.1.3.1.1, Process 3 and Data Store E3

DATA DESTINATION: DFD 2.1.3.1.1., Data Store E3 and Process 3

STRUCTURE: Data elements shall include:

Data Item

Description

Item Type

Type of knowledge test item (true/false, multiple choice, list multiple choice, matching, fill-in-the-blank, touch, or sequence touch).
Data Type: Alpha string.

Item Stem

The statement/question setting forth the situation to which an examinee must respond. The stem may contain up to three graphics.
Data Type: Alpha/numeric string, not to exceed 3600 characters/spaces.

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DATA FLOW: Knowledge Test Item (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Graphics Data (optional)

- Graphic ID(s) Alphanumeric name(s) or code(s) used to call up the graphic(s) selected by the test developer/reviser for use in the test item stem. Up to three graphic IDs can be specified.
Data Type: Alpha/numeric string, not to exceed 10 characters/spaces.
- Graphic(s) The actual graphic(s) selected by the developer/reviser. Up to three graphics can exist for the test item stem.
- Presentation Specifications Specifications defined by the test item developer/reviser concerning the placement, scaling, rotation and coloring of each selected graphic.
Data Type: X/Y coordinates for placement data; numeric (1-10) for scaling factor; numeric (0-360 degrees) for rotation data; and numeric (0-8) for color data.

Response Alternatives Response alternatives to the situation posed in the item stem that are defined by the test item developer/reviser.
Data Type for alternatives depends on the type of knowledge test item.

Correct Answer(s) Response alternative(s) designated by the test item developer/reviser as the correct response to the item stem.
Data Type for correct answer(s) depends on the type of knowledge test item.

Feedback Comments by the test item developer or reviser for each response alternative.
Data Type: Alpha/numeric string, not to exceed 240 characters.

Specification Number 70S647300B
Code Ident. No. 76301.
Date: 31 October 1989

DATA FLOW: Operational Environment Info

DESCRIPTION: Off-line information about the operational environment in the workcenter in which a particular task is performed. The operational environment information will be used by an evaluation materials planner; the information will be considered along with task analysis and behavioral objective data to determine evaluation parameters for the task.

DATA SOURCE: External Entity 5

DATA DESTINATION: DFD 2.1, Process 2
DFD 2,1.2, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents. Data Type: verbal or written.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Operational Feedback

DESCRIPTION: Off-line comments, criticisms and observations from a workcenter concerning the fit of specific AOTS evaluation materials to the workcenter situation and the perceived effectiveness of the materials in providing an accurate assessment of task performance. Operational feedback (along with task analysis, behavioral objective, test development and test/test item analysis data) shall be used by an evaluation materials developer/reviser to validate the evaluation materials (tests/test items) for a given task.

DATA SOURCE: External Entity 5

DATA DESTINATION: DFD 2.1, Process 3
DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents. Data Type: verbal or written.

Specification Number 70S647300B
Code Ident. No. 76301
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DATA FLOW: OTG

DESCRIPTION: An Oral Test Guide (OTG) under development or revision. The OTG shall consist of instructions for administering a task performance evaluation or a Quality Control (QC) evaluation. Once developed, the OTG shall be stored with other test items being maintained by the Test Item Bank; the OTG may be revised as deemed necessary.

DATA SOURCE: DFD 2.1.3.1.1, Process 1 and Data Store E3

DATA DESTINATION: DFD 2.1.3.1.1, Data Store E3 and Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
OTG ID	The unique, numeric, test item ID automatically established for the OTG when it was initially developed. Data Type: Integer (number is limited only by system's capacity for relative records per file).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

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DATA FLOW: OTG (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
OTG Text	
- Behavioral Objective Statement	The complete behavioral objective statement for which the OTG applies.
- Evaluator Info	Information to be used by an evaluator to help prepare for a specific task or Quality Control evaluation. Such information will include: estimated time to conduct the evaluation; prerequisite tasks which should be trained and evaluated before the evaluation is conducted; whether the task is performed by one individual or by a team; the tools, equipment and materials (TEMs) required by the evaluatee; the TEMs required by the evaluator; and any conditions under which the evaluation must be conducted.
- Evaluator Instructions	Guidelines for administering the performance evaluation, including the wording of the spoken instructions that the evaluator will say to the airman/trainee.
Data Type for OTG Text: Alpha/numeric string, not to exceed 8000 characters/spaces.	

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: PEC

DESCRIPTION: A Performance Evaluation Checklist under development or revision. The checklist shall specify the steps required to be performed by a trainee during a task performance evaluation or a Quality Control (QC) evaluation. The PEC shall be used by the evaluator, to record observations of a trainee's attempt to perform the steps listed on the checklist. Once developed, the PEC shall be stored with other test items being maintained by the Test Item Bank; the PEC may be revised as deemed necessary.

DATA SOURCE: DFD 2.1.3.1.1, Process 2 and Data Store E3

DATA DESTINATION: DFD 2.1.3.1.1, Data Store E3 and Process 2

STRUCTURE: Data elements shall include:

Data Item

Description

PEC ID

The unique numeric test item ID automatically established for the PEC when initially developed.
Data Type: Integer (number is limited only by system's capacity for relative records per file).

PEC Steps

The text for each PEC step. There shall be a maximum of 60 steps.
Data Type (for each step):
Alpha/numeric string, not to exceed 160 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Publications

DESCRIPTION: Off-line regulations, manuals, technical orders, operating instructions and other types of publications which contain reference information applicable to one or more tasks. These publications provide task proficiency and performance criteria from which behavioral objectives and test items are developed. Publications are used to plan evaluation materials (to help determine evaluation strategies), maintain behavioral objectives and test items data, and to validate implemented evaluation materials.

DATA SOURCE: External Entity 2

DATA DESTINATION: DFD 2.1, Process 1, 2, 3
DFD 2.1.1, Process 1, 2
DFD 2.1.1.1, Process 2, 3
DFD 2.1.2, Process 1
DFD 2.1.3, Process 1, 2
DFD 2.1.3.1, Process 1, 2
DFD 2.1.3.1.1, Process 1, 2, 3
DFD 2.1.3.2, Process 1, 3
DFD 2.1.3.2.1, Process 1

STRUCTURE: Data elements shall include:

<u>Data Items</u>	<u>Descriptions</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents.

Specification Number 70S647300B
Code Ident. No. 76301
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DATA FLOW: Publication Change Notice

DESCRIPTION: A printed notice containing explicit information identifying one or more portions of one or more references (publications) which have been changed. Changes in a publication may also require changes in data being maintained by the AOTS, therefore, the change notice information shall be used to aid in determining revisions for tasks, subtasks, behavioral objectives and test items potentially affected by publication changes. The potentially affected tasks, subtasks, behavioral objectives and test items shall be specified for each changed publication.

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.1, Process 1, 2 and 3
DFD 2.1.1, Process 2
DFD 2.1.3, Process 1, 2
DFD 2.1.3.1, Process 1, 2
DFD 2.1.3.1.1, Process 1, 2, 3
DFD 2.1.3.2, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
IDs of Changed Publications	The title and identification code of each publication that has been changed for which the AOTS maintains data. Data Type for ID: alpha/numeric string not to exceed 20 characters/spaces. Data Type for title: alpha/numeric string not to exceed 80 characters and/or spaces.

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DATA FLOW: Publication Change Notice

STRUCTURE: (continued)

Data Items

Descriptions

IDs of AOTS data
potentially affected

The task, subtask, behavioral objective
and test item IDs potentially affected
by each publication change.
Data Types: task ID is an alpha/numeric
string, not to exceed 6 characters; sub-
task ID is an integer (range 1-25);
behavioral objective ID is an integer;
test item ID is an integer.

Changed Publication
Breakdowns

Designation of particular segment(s) of
a publication which more explicitly
identify the task performance and
proficiency data (chapters, paragraphs,
tables, etc.) which have been changed.
Data Types: alpha/numeric string not to
exceed 40 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

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DATA FLOW: Revised BO Data

DESCRIPTION: Modifications that an evaluation materials reviser has specified for a given behavioral objective. The revision may include a change in the BO statement, references, resources and/or training materials. The most recent BO data are extracted from the BO files and the revised BO data replaces the previously stored BO data.

DATA SOURCE: DFD 2.1.1, Process 2

DATA DESTINATION: DFD 2.1.1, Data Store E1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Revised Objective Statement	The new complete BO statement. Data Type: Alpha/numeric string, not to exceed 240 characters/spaces.
Revised References	The new list of references (publications) and publication breakdowns (paragraphs, chapters, etc) which apply to the behavioral objective. Data Type: Array (1-X reference names and descriptions, where X cannot exceed 6); Array (1-X breakdowns, where X cannot exceed 100).
Revised Resources	The new list of performance, training and/or evaluator resources applicable to the behavioral objective. Data Type: Array (1-X performance resources); Array (1-X evaluator resources); Array (1-X training resources); where X cannot exceed 30.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

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DATA FLOW: Revised BO Data (continued)

STRUCUTE: (continued)

Data Items

Descriptions

Revised Training
Materials

The new list of training materials
applicable to the behavioral objective.
Data Type: Array (1-X training
materials types, IDs and descriptions),
where X cannot exceed 15.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Selected Objectives and Test Items

DESCRIPTION: Specification of the objectives and test items that have been selected by an evaluation materials developer for inclusion in a particular knowledge or performance test under development or revision.

DATA SOURCE: DFD 2.1.3.2.1, Process 1 and Data Store E4

DATA DESTINATION: DFD 2.1.3.2.1, Data Store E4 and Process 1, 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Objective IDs	Each objective ID for which the test applies. (An Objective ID is a unique number identifying a particular behavioral objective automatically assigned by the system.) Data Type: Array (1-X objective IDs), where X cannot exceed 6.
Test Item IDs	The test item ID that corresponds to each test item that is incorporated into the test. (A test item ID is a unique number identifying a particular test item, automatically assigned by the system.) Data Type: Array (1-X test item IDs), where X cannot exceed 100.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Task Evaluation Parameters

DESCRIPTION: Off-line information derived by an evaluation materials planner which is used to determine evaluation strategies and resource requirements for a given task. Evaluation parameters result from an analysis of task and behavioral objective data combined with operational environment information and include:

- Task skill and knowledge requirements which must be evaluated,
- Task performance literacy requirements (nomenclature) which must be evaluated,
- Influencing environmental conditions which must be considered,
- Task performance variance across work centers which must be estimated, and
- Probability of change within work centers.

DATA SOURCE: DFD 2.1.2, Process 1

DATA DESTINATION: DFD 2.1.2, Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Task Evaluation Strategy Info

DESCRIPTION: Off-line information determined by an evaluation materials planner, which provides his/her perception of the evaluation strategy that will be most efficient and effective for rating trainees' ability to perform a given task. This information shall identify the initial assessment of the evaluation materials that shall be needed as well as the resource availability or constraints that exist. One or more of the following evaluation strategies may apply to the task: over-the-shoulder observation, knowledge testing, product evaluation, rigged (scenario), simulation, other.

DATA SOURCE: DFD 2.1, Process 2
DFD 2.1.2, Process 2

DATA DESTINATION: DFD 2.1, Process 3
DFD 2.1.3, Process 1, 2
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 1, 2, 3
DFD 2.1.3.2, Process 1, 3
DFD 2.1.3.2.1, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Task/Subtask Performance Resources

DESCRIPTION: Tools, equipment and materials identified in the Master Task List (MTL) as required for successful performance of a given task/subtask. These resources are used by a behavioral objective developer/reviser to specify those performance resources which apply to a behavioral objective under development/revision for the task/subtask.

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.1.1.1, Process 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Performance Resources	List of tools, equipment and materials that were identified in the MTL for the task/subtask. Data Type: Array (1-X names and descriptions), where X cannot exceed 30.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Task/Subtask References

DESCRIPTION: Publications identified in the Master Task List (MTL) as providing task performance and proficiency requirements for a given task/subtask. These publications are used by a behavioral objective developer/reviser to specify those references (publications) which apply to a behavioral objective under development/revision for the task/subtask.

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.1.1.1, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
References	List of references (publications) that were identified in the MTL for the task/subtask. Each reference is identified by title and identification code. Data Type: Array (1-X titles and IDs), where X cannot exceed 6.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Task/Subtask Statement

DESCRIPTION: Statement which adequately and accurately describes the performance or action required to accomplish a given task or subtask. The statement contains an object and an action verb. The statement is used by a behavioral objective developer to develop one or more BO statements for the task/subtask. The statement may be identical to an OSR task statement, a revision of an OSR task statement, or a statement created by a Subject Matter Expert (SME).

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.1.1.1, Process 1 and 2

STRUCTURE: N/A. Data Type: Alpha/numeric string, not to exceed 240 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Analysis Data

DESCRIPTION: Data applicable to a given test, which are used to analyze the test and its test items. The data are extracted from data stored for the test, and are consolidated with test item analysis and test score data to perform an analysis of the test/test items.

DATA SOURCE: Data Store E4

DATA DESTINATION: DFD 2.1.3.2, Process 2
DFD 2.1.3.2.2, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test ID Data	Includes task ID, subtask ID (if applicable), objective ID, and test ID.
Selected Objectives and Test Items	Behavioral objectives and test items selected for inclusion in the test. Behavioral objectives are identified by BO IDs; test items are identified by BO ID and Test Item ID.
Test Format Data	
- Order of Items	Order in which the items will appear in the test at presentation (if the item scrambling option in the test parameters has not been invoked).
- Critical Items	Items designated as critical items.
- Pass Criterion	(Knowledge test only) Number of correct responses required to achieve a passing score on the objective.
Test Parameter Data for Analysis	Includes the following parameters: item analysis enabled and item scrambling enabled or disabled.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Analysis Request Data

DESCRIPTION: An on-line request for an analysis of a given test and its test items. The data are: entered via the keyboard by a test analyzer; and used by the system to identify and extract the respective test samples and test items to be analyzed.

DATA SOURCE: DFD 2.1.3.2.2, Process 2

DATA DESTINATION: DFD 2.1.3.2.2, Process 1

STRUCTURE: Data elements will include:

<u>Data Item</u>	<u>Description</u>
Test Key Identification Data	Identification data which are keyed to permit an analysis of a given test to be performed. Such data are documented for all tests on a product titled: Test Item Analysis Keys; the applicable keyed data is taken from the product and entered into the keyboard by a test analyzer.
Test Analysis Selection Criteria	Data specifying the criteria for analysis, to include one or more of the following: <ul style="list-style-type: none">- Test Media (on-line samples, off-line samples or all samples)- Samples of the test administered/scored during a specified timeframe (data for begin date and end date will also apply),- Samples of the test which have been failed,- Samples of the test which have been passed, or- All samples of the test.

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DATA FLOW: Test Data

DESCRIPTION: Complete specifications developed or revised for a particular performance or knowledge test.

DATA SOURCE: DFD 2.1, Process 3 and Data Store E4
DFD 2.1.3, Process 2 and Data Store E4
DFD 2.1.3.2, Process 1 and Data Store E4

DATA DESTINATION: DFD 2.1, Data Store E4 and Process 3
DFD 2.1.3, Data Store E4 and Process 2
DFD 2.1.3.2, Data Store E4 and Process 1, 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test ID Data	Includes task ID, subtask ID (if applicable), objective ID, and test ID.
Selected Objectives and Test Items	Behavioral objectives and test items selected for inclusion in the test. Behavioral objectives are identified by BO IDs; test items are identified by BO ID and Test Item ID.
Test Format Data	
- Order of Items	Order in which the items will appear in the test at presentation (if the item scrambling option in the test parameters has not been invoked).
- Critical Items	Items designated as critical items.
- Pass Criterion	(Knowledge test only) Number of correct responses required to achieve a passing score on the objective.

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DATA FLOW: Test Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
Test Parameter Data	
- Test Use	Designation that the test is either the primary test of its type (performance or knowledge) or an alternate test.
- Item Analysis	Item analysis capability enabled or disabled. Default shall be enabled.
- Maximum Analysis Samples	Maximum number of samples of test scores that will stored by the system for use in item analysis. Range shall be 30 to 100; default shall be 50.
- Time Allowed	(Knowledge tests only) Time allowed the airman for completing the test, Range shall be 1 to 1440 minutes; default shall be 60 minutes.
- Item Scrambling	(Knowledge tests only) Enable or disable scrambling of items at presentation. Default shall be disabled.
- Test Interruption	(Knowledge tests only) Interruption to be allowed/disallowed during testing. Default shall be allowed.
- Test Item Recap	(Knowledge tests only) Recapitulation of missed test items with correct response displayed to be allowed/disallowed during online testing. Default shall be disallowed.
Test Instructions	(Knowledge test only). Instructions which include the test purpose and testing procedures.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Data for Event Scheduling

DESCRIPTION: Data applying to a particular test, which is passed to the Management Subsystem to enable the scheduling of an evaluation event. These data shall support either a task performance evaluation or a Quality Control (QC) evaluation event.

DATA SOURCE: DFD 2.1, Data Store E4
DFD 2.1.3, Data Store E4
DFD 2.1.3.2, Data Store E4

DATA DESTINATION: External Entity 1.3

STRUCTURE: Data elements shall include:

<u>Data Items</u>	<u>Descriptions</u>
Test ID	The unique number assigned by the system to identify the test among other tests developed for a given task/subtask/objective.
Administration Data	The designation of whether the test can be administered on line, off line or either, depending on the developer's instructions. (Only applies if test is a knowledge test; a performance test is always administered off line.)

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Format Data

DESCRIPTION: Data for a particular test under development or revision that identifies critical test items and establishes the order in which the test items shall be presented.

DATA SOURCE: DFD 2.1.3.2.1, Process 2 and Data Store E4

DATA DESTINATION: DFD 2.1.3.2.1, Data Store E4 and Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Set Critical	A test item that is considered critical to task performance shall be flagged as critical. All critical items must be passed.
Test Item Order	The order in which the test items shall be presented to the airman/trainee who is being evaluated.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test ID

DESCRIPTION: A number assigned by the system to a particular test that was developed for a particular objective. The Test ID shall be used to key (link):

- The test format, parameters, and knowledge testing instructions (if applicable) and
- The test to each test item incorporated in the test.

DATA SOURCE: DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 1
DFD 2.1.3.2.1, Process 1

DATA DESTINATION: DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 3
DFD 2.1.3.2.1, Data Store E4

STRUCTURE: N/A. Data Type: Integer (number is limited only by system's capacity for relative records per file).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item

DESCRIPTION: An oral test guide (OTG), a performance evaluation checklist (PEC), or any one of the eight types of knowledge test items (true/false, multiple choice, list multiple choice, matching, constructed response, limited constructed response, single area touch, or sequence touch) under development or revision for a given behavioral objective.

DATA SOURCE: DFD 2.1.3.1, Process 1 and Data Store E3

DATA DESTINATION: DFD 2.1.3.1, Data Store E3 and Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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Refer to Data Flows titled: OTG, PEC, or Knowledge Test Item.
Data items/descriptions applicable to these data flows also apply to this data flow.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item Analysis Data

DESCRIPTION: Data which are used to analyze the test items for a specific test. The data are extracted from the Test Item Bank and consolidated with test analysis and test score data for analyzing the test and each of its items.

DATA SOURCE: Data Store E3

DATA DESTINATION: DFD 2.1.3.2, Process 2
DFD 2.1.3.2.2, Process 1

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Objective IDs	The behavioral objective ID(s) for which each test item applies. Each BO ID is a unique number assigned by the system when the respective behavior objective was developed.
Test Item IDs	The test item ID for each respective test item incorporated in the test. Each test item ID is a unique number assigned by the system when the respective test item was developed.
Correct Answers	The response alternative(s) designated for each test item incorporated in the test. Each correct answer is designated by the test item developer/reviser when the respective test item was developed or revised.
Alternative Scrambling Option	The designation that response alternatives were presented in fixed order or were scrambled.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

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DATA FLOW: Test Item Analysis Key

DESCRIPTION: A printed product which identifies test keys for each test being stored within the AOTS. The listing is sorted by AFS and AOTS Task ID, and is used by a test analyzer to input specific data to initiate an analysis for any test listed.

DATA SOURCE: DFD 2.1, Process 3 and Data Store E7
DFD 2.1.3, Process 2 and Data Store E7
DFD 2.1.3.2, Process 2 and Data Store E7
DFD 2.1.3.2.2, Process 1

DATA DESTINATION: DFD 2.1, Data Store E7 and Process 3
DFD 2.1.3, Data Store E7 and Process 2
DFD 2.1.3.2, Data Store E7 and Process 2
DFD 2.1.3.2.2, Data Store E7 and Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
AFSC	Alpha/numeric code and title identifying an Air Force Specialty.
AOTS Task IDs	The task IDs which apply to tasks for which one or more tests exist for analysis. Each task ID is an alpha/numeric string of 6 characters.
Subtask IDs	The subtask numbers which apply to subtasks for which one or more tests exist for analysis. Each subtask ID is a numeric, not to exceed 25.
Objective IDs	The behavioral objective IDs which apply to objectives for which one or more tests exist for analysis. Each Objective ID is a numeric.

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DATA FLOW: Test Item Analysis Key (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Test IDs

The test IDs which apply to tests existing for analysis. Each test ID is a numeric.

Test Keys

The keys which apply to tests existing for analysis. Each test key is a sequential array of six numeric, one or two digit, codes that must be input via the keyboard to perform an analysis of the respective test and its test items.

Page 1 of 2

DATA FLOW: Test Item Data

DESCRIPTION: All data developed or revised for a particular test item, to include: identification data, text, specifications, and references.

For the Evaluation Instrument Management Component: these data are maintained with other test item's data within the Test Item Bank; are used when developing/revising a test which incorporates the test item; and are used when validating the test item.

DATA SOURCE: DFD 2.1, Process 3 and Data Store E3
DFD 2.1.3, Process 1 and Data Store E3
DFD 2.1.3.2, Data Store E1
DFD 2.1.3.2.1, Data Store E1

DATA DESTINATION: DFD 2.1, Data Store E3 and Process 3
DFD 2.1.3, Data Store E3 and Process 1, 2
DFD 2.1.3.2, Process 1, 2
DFD 2.1.3.2.1, Process 1

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Test Item Identification Data	Data that identifies a particular test item, including task/subtask ID, behavioral objective ID and test item ID.
Test Item Type	Oral test guide (OTG), performance evaluation checklist (PEC), or any of the eight types of knowledge test items: true/false, multiple choice, list multiple choice, matching, constructed response, limited constructed response, single area touch, or sequence touch.

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Code Ident. No. 76301
Date: 31 October 1989

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DATA FLOW: Test Item Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
Test Item Contents	Test item text and specifications. The contents depend on the type of test item. Refer to the data flows titled: OTG, PEC or Knowledge Test Item, for descriptions of test item contents data.
Test Item References and Breakdowns	Titles, identification codes, and breakdowns of the publications that specify performance and proficiency requirements applicable to the test item.
Test IDs	The unique numerical test IDs for tests which incorporate the test item.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item Evaluation (TIE) Report

DESCRIPTION: A report which documents test, subscale (objective) and test item results for a given test. This report is generated once an automated analysis of the test and its test items are performed for the purpose of validating the evaluation materials.

DATA SOURCE: DFD 2.1.3.2, Process 2
DFD 2.1.3.2.2, Process 2

DATA DESTINATION: DFD 2.1.3.2, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Analyzed Test Data	Number of samples included in the analysis; date range of the included samples; number of test failures due to total percent; number of test failures due to critical objective failed (every objective shall be considered critical).
Analyzed Subscale (Objective) Data	Number of failures; mean score; standard deviation; critical objective (yes/no); number of items associated with objective; number of items needed to pass objective; alpha reliability; item correlation.
Analyzed Item Data (for each test item)	Subscale associated with item; mean; standard deviation; number of failures; critical item (yes/no); test item correlation to objective; test item correlation to total test; correct alternative(s); alternative(s) raw scores; alternative(s) percent score.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item ID

DESCRIPTION: A unique numeric identifier assigned by the system to a given test item. A test item ID shall be:

- Stored with other data developed/revised for the test item in the Test Item Bank, to key (link) the respective test item data,
- Passed to the Management Component, to key (link) the test item to the respective references.

DATA SOURCE: DFD 2.1, Process 3
DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 1, 2, 3

DATA DESTINATION: DFD 2.1, External Entity 1.1
DFD 2.1.3, External Entity 1.1
DFD 2.1.3.1, External Entity 1.1 and Data Store E3
DFD 2.1.3.1.1, External Entity 1.1 and Data Store E3

STRUCTURE: N/A. Data Type: Integer (number is limited only by system's capacity for relative records per file).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item References

DESCRIPTION: Data identifying the publications and their breakdowns which specify the performance and proficiency requirements which apply to a given test item under development/revision. Test Item references are selected from references identified for the behavioral objective for which the test item applies. Test Item publication breakdowns are itemized for each selected publication.

DATA SOURCE: DFD 2.1.3.1, Process 2 and Data Store E3

DATA DESTINATION: DFD 2.1.3.1, Data Store E3 and Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Item References	Publications listed by identification code and title that apply to the test item. Data Type: Array (1-X publication IDs/titles; where X cannot exceed 6).
Test Item Publication Breakdowns	A list of particular segments (chapters, paragraphs, tables, etc.) for each test item reference. Data Type: Array (1-X breakdowns; where X cannot exceed 100).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Item Revision Requirement(s)

DESCRIPTION: A test validator's perception of changes that are needed in a particular test in order to make the test more effective for evaluating task knowledge and/or performance. For example: a performance evaluation checklist (PEC) might need to be revised to include additional steps or to clarify misleading or inaccurate steps; a knowledge test item might need to be revised because one or more of the alternatives do not adequately discriminate between individuals who have the requisite knowledge and those who do not.

Based on the test item revision requirement(s), the test item developer may need to develop one or more new items, revise existing test items or delete inadequate test items.

DATA SOURCE: DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 3

DATA DESTINATION: DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 1
DFD 2.1.3.1.1, Process 1, 2, 3

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt was made to specify its contents.

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DATA FLOW: Test Parameter Data

DESCRIPTION: Parameters that have been established for a particular performance or knowledge test by the test developer/reviser. These data shall be stored with other data being maintained for the test; and are revised as deemed necessary.

DATA SOURCE: DFD 2.1.3.2.1, Process 3 and Data Store E4

DATA DESTINATION: DFD 2.1.3.2.1, Data Store E4 and Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Time Allowed	Maximum time limit for completing the test. Default shall be 60 minutes; range shall be 1 to 1440 minutes.
Test Use	Test may be designated as the primary or an alternate test for its test category (performance or knowledge).
Item Analysis	Item analysis may be enabled or disabled.
Maximum Analysis Samples	Number of scored samples of the test that the system will accumulate and store for analysis/validation purposes. When the set number has been reached, no more scored samples of the test will be retained. Default shall be 50; the range is 30 to 100.
Item Scrambling	Items may be presented in fixed or scrambled order. Scrambled order will result in the items appearing in a different order each time the test is generated for online use or is printed.

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DATA FLOW: Test Parameter Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
Test Interruption	The test developer may allow or disallow the interruption of a knowledge test administered on line.
Test Recapitulation	The test developer may allow or disallow an airman taking the test on line to view answered test items and the respective correct answers and feedback.

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DATA FLOW: Test Score Data

DESCRIPTION: Data which result from the scoring of a given knowledge or performance test (see Process 2.2.3 of the Performance Evaluation Component). These data are aggregated for each scored sample of the test (up to the maximum number of samples designated) and are stored with test score data for other scored tests (see Data Store E6).

Within the Evaluation Instrument Management Component, the aggregated data are extracted and used, along with other data, to analyze the test and its test items for the purpose of validating the evaluation materials. Some test score data applies to either a performance or a knowledge test; other test score data depends on the type of test scored.

DATA SOURCE: Data Store E6

DATA DESTINATION: DFD 2.1, Process 3
DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 2
DFD 2.1.3.2.2, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data identifying the specific test, to include the task ID, subtask ID (if applicable), behavioral objective ID and test ID.
Dates of Administration	Range of dates during which the test samples were scored.
Number of Samples	Number of test samples scored.

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DATA FLOW: Test Score Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
Test Item Identification Data	Data identifying each test item incorporated in the test, to include the behavioral objective Id and test item ID.

Performance Test Score Data

- | | |
|-----------------------|--|
| - Pass/Fail Data | Total number of test failures. |
| - Step Pass/Fail Data | Number of steps failed by each examinee, specific steps failed, number of steps unobserved, specific steps unobserved. |
| - Critical Step | Critical steps failed, number of times each critical step was failed. |

Knowledge Test Score Data

- | | |
|-----------------------------|---|
| - Pass/Fail Data | Total number of test failures. |
| - Percentage Correct | Percentage of correct items on each test administration. |
| - Incorrect Items | Identification of test items failed and number of failures on each item. |
| - Response Alternative Data | Response alternatives selected on each item and number of times each response alternative was selected. |
| - Objectives Failed | Identification of failed objectives and and number of times each objective was failed. |
| - Critical Items | Identification of failed critical items and number of times that each was failed. |

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Test Revision Requirement(s)

DESCRIPTION: A test validator's perception of changes that are needed in a particular test in order to make it a more effective instrument for task performance and/or knowledge evaluation. Based upon the test revision requirement(s), the test developer might need to develop new items for the test, delete items from the test, develop a new test, delete an inadequate test, reformat the test, redefine the test parameters, or make some other revision.

DATA SOURCE: DFD 2.1.3.2, Process 3

DATA DESTINATION: DFD 2.1.3.2, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
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This data flow is situationally specific; therefore, no attempt is made to specify its contents.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Training/Evaluator Resource Data for Inventory

DESCRIPTION: Specification of resources (tools, equipment and materials) required for training and/or evaluation for a given task which are not already listed in the AOTS inventory of resources. These resources are defined by a behavioral objective developer/reviser when specifying the resources for a particular behavioral objective. The name of each resource is passed to the Management Subsystem, whereby additional data for the resource is then updated to the AOTS inventory.

DATA SOURCE: DFD 2.1, Process 1
DFD 2.1.1, Process 1, 2
DFD 2.1.1.1, Process 4

DATA DESTINATION: External Entity 1.3

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Training Resources	Name of each training resource not found in the AOTS inventory of resources. Data Type: Alpha/numeric string, not to exceed 40 characters/spaces.
Evaluator Resources	Name of each evaluator resource not found in the AOTS inventory of resources. Data Type: Alpha/numeric string, not to exceed 40 characters/spaces.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

20.2.2 Evaluation Instrument Management Component Data Stores.

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DATA STORE: E1, Consolidated BO Data

DESCRIPTION: Data stored for all behavioral objectives which have been developed or revised for tasks or subtasks for all AFSSs operating under the AOTS.

- As data for each objective are developed, the data are stored within this central data file; as data are revised, the existing data are extracted from the file and replaced by the revised data.
- Objective identification data, the complete behavioral objective statement, references and their breakdowns, resources and training materials applicable to each behavioral objective shall be stored in this file.
- Once a behavioral objective is deleted, all data for that BO shall be automatically deleted from this datastore.

DATA SOURCE: DFD 2.1, Process 1
DFD 2.1.1, Process 1, 2
DFD 2.1.1.1, Process 2, 3, 4, 5

STRUCTURE: An online file which shall include the following data items for each objective:

Data Item

Description

Objective ID

A unique number identifying the particular behavioral objective for which the data applies. This ID is automatically assigned by the system once the BO statement is developed, and cannot be revised.

Data Type: Integer (number is limited only by system's capacity for relative records per file).

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DATA STORE: E1, Consolidated BO Data (continued)

STRUTURE: (continued)

Data Items

Descriptions

Complete Behavioral Objective Statement

- | | |
|------------------------|--|
| - Behavioral Component | A brief statement headed by an active verb that specifies the required behavior. |
| - Conditions Component | The operational conditions under which the required behavior will normally occur. |
| - Standards Component | A measurable minimum level of performance that shall be considered to demonstrate an acceptable level of competency. |

Data Type for complete statement:
alpha/numeric string, not to exceed 240
characters/spaces.

BO References Data

- | | |
|----------------|---|
| - Publications | Publications listed by identification code and and title that define the performance and proficiency requirements for the objective.
Data Type: Array (1-X publication IDs/titles; where X cannot exceed 6). |
| - Breakdowns | Breakdowns (by section, chapter, figure, table, page, or other part) of the publications that define the performance and proficiency requirements for the objective.
Data Type: Array (1-X breakdowns; where X cannot exceed 100). |

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

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DATA STORE: E1, Consolidated BO Data (continued)

STRUCTURE: (continued)

Data Items

Descriptions

BO Resources

List of tools, equipment and material required for successful performance of the objective (called performance resources), as well as the training and evaluator resources required to accomplish the objective.

Data Type: Array (1-X performance resources); Array (1-X evaluator resources); Array (1-X training resources); where X cannot exceed 30.

BO Training Materials

List of training materials which exist for accomplishing the objective. These materials can be of many types: Computer Assisted Instruction (CAI) lessons, films, sound-on-slide presentations, etc. Data for each material includes: Name of item, type of item and other identification data (course ID, film number/ID, etc.)

Data Type: Array (1-X materials), where X cannot exceed 15.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA STORE: E2, Bad Verb List

DESCRIPTION: A list of inactive verbs maintained on line by behavioral objective developers and revisers. Verbs maintained on this list are matched to the verb included in each behavioral objective statement under development/revision; a match requires the BO developer/reviser to change the BO statement verb.

DATA SOURCE: DFD 2.1, Process 1
DFD 2.1.1, Process 3

STRUCTURE: A file which shall maintain up to 100 bad verbs.
Data elements shall include:

Data Item

Description

Bad Verbs

Each inactive verb not acceptable for use as the main verb in a BO statement.
Data Type: Alpha string, not to exceed 20 characters/spaces.

Page 1 of 4

DATA STORE: E3, Test Item Bank

DESCRIPTION: The central depository of all data for all test items (Oral Test Guides, Performance Evaluation Checklists and knowledge test items) that have been developed or revised.

- As data for each test item are developed, the data are stored within this central data store; as data are revised, the existing data are extracted from the file and replaced by the revised data.
- Test item identification data, the test item contents and references which apply to each test item are stored within this file.
- Once a test item is deleted, all data for that test item shall automatically be deleted from this datastore.

DATA SOURCE: DFD 2.1, Process 3
DFD 2.1.3, Process 1
DFD 2.1.3.1, Process 1, 2, 3
DFD 2.1.3.1.1, Process 1, 2, 3

STRUCTURE: An online file which shall include the following data for each test item:

<u>Data Item</u>	<u>Description</u>
Test Item Identification Data	Data that identifies a particular test item, including the behavioral objective ID to which the test item applies and the test item ID.

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DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Test Item Type	Oral test guide (OTG), performance evaluation checklist (PEC), or any of the eight types of knowledge test items: true/false, multiple choice, list multiple choice, matching, constructed response, limited constructed response, single area touch, or sequence touch.
Test Item Contents	Test item text and specifications. The contents depend on the type of test item:
- OTG contents	
-- Behavioral Objective Statement	The complete behavioral objective statement for which the OTG applies.
-- Evaluator Info	Information to be used by an evaluator to help prepare for a specific task or Quality Control evaluation. Such information will include: estimated time to conduct the evaluation; prerequisite tasks which should be trained and evaluated before the evaluation is conducted; whether the task is performed by one individual or by a team; the tools, equipment and materials (TEMs) required by the evaluatee; the TEMs required by the evaluator; and any conditions under which the evaluation must be conducted.
-- Evaluator Instructions	Guidelines for administering the performance evaluation, including the wording of the spoken instructions that the evaluator will say to the airman/trainee.

Page 3 of 4

DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Test Item Contents (continued)	

- PEC contents

- PEC steps The text for each PEC step. There shall be a maximum of 60 steps.

- Knowledge Test Item contents

- Item Stem The statement/question setting forth the situation to which an examinee must respond. The stem may contain up to three graphics.
Data Type: Alpha/numeric string, not to exceed 3600 characters/spaces.

- Graphics Data (optional)

Graphic ID(s)	Alphanumeric name(s) or code(s) used to call up the graphic(s) selected by the test developer/reviser for use in the test item stem. Up to three graphic IDs can be specified. Data Type: Alpha/numeric string, not to exceed 10 characters/spaces.
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Graphic(s)	The actual graphic(s) selected by the developer/reviser. Up to three graphics can exist for the test item stem.
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Presentation Specifications	Specifications defined by the test item developer/reviser concerning the placement, scaling, rotation and coloring of each selected graphic. Data Type: X/Y coordinates for placement data; numeric (1-10) for scaling factor; numeric (0-360 degrees) for rotation data; and numeric (0-8) for color data.
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DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Knowledge Test Item Contents (continued)

- | | |
|--------------------------|---|
| -- Response Alternatives | Response alternatives to the situation posed in the item stem that are defined by the test item developer/reviser. Data Type for alternatives depends on the type of knowledge test item. |
| -- Correct Answer(s) | Response alternative(s) designated by the test item developer/reviser as the correct response to the item stem. Data Type for correct answer(s) depends on the type of knowledge test item. |
| -- Feedback | Comments by the test item developer or reviser for each response alternative. Data Type: Alpha/numeric string, not to exceed 240 characters. |

Test Item References and Breakdowns

Titles, identification codes, and breakdowns of the publications that specify performance and proficiency requirements applicable to the test item.

Test IDs

The unique numerical test IDs for tests which incorporate the test item.

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DATA STORE: E4, Consolidated Test Data

DESCRIPTION: The central depository of all data for all tests that have been developed or revised.

- As data for each test are developed, the data shall be stored within this file; as data are revised, the existing data are extracted from this file and replaced by the revised data.
- Test identification data, applicable objectives and test items, test format data and test parameter data which apply to each test shall be stored within this file. Additionally, for each knowledge test, the on-line/off-line instructions shall also be included within this file.
- Once a test is deleted, all data for that test shall automatically be deleted from this datastore.

DATA SOURCE: DFD 2.1, Process 3
DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 1
DFD 2.1.3.2.1, Process 1, 2, 3, 4

STRUCTURE: An on-line file which shall include the following data for each test:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies a particular test, including the behavioral objective ID to which the test mainly applies and the test ID.

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DATA STORE: E4, Consolidated Test Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Selected Objectives and Test Items	Behavioral objectives and test items selected for inclusion in the test. Each behavioral objective is identified by its respective BO ID; each test item is identified by its respective Test Item ID.
Test Format Data	
- Order of Items	Order in which the items will appear in the test at presentation (if the item scrambling option in the test parameters has not been invoked).
- Critical Items	Items designated as critical items.
- Pass Criterion	(Knowledge test only) Number of correct responses required to achieve a passing score on the objective.
Test Parameter Data	
- Test Use	Designation that the test is either the primary test of its type (performance or knowledge) or an alternate test.
- Item Analysis	Item analysis capability enabled or disabled. Default shall be enabled.
- Maximum Analysis Samples	Maximum number of samples of test scores that will stored by the system for use in item analysis. Range shall be 30 to 100; default shall be 50.
- Time Allowed	(Knowledge tests only) Time allowed the airman for completing the test. Range shall be 1 to 1440 minutes; default shall be 60 minutes.

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DATA STORE: E4, Consolidated Test Data (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Test Parameter Data (continued)

- Item Scrambling (Knowledge tests only) Enable or disable scrambling of items at presentation. Default shall be disabled.
- Test Interruption (Knowledge tests only) Interruption to be allowed/disallowed during testing. Default shall be allowed.
- Test Item Recap (Knowledge tests only) Recapitulation of missed test items with correct response displayed to be allowed/disallowed during online testing. Default shall be disallowed.

Test Instructions

(Knowledge test only). Instructions which include the test purpose and testing procedures.

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DATA STORE: E6, Consolidated Test Score Data

DESCRIPTION: Data stored for all knowledge and performance tests which have been scored using an AOTS keyboard or an Optical Mark Reader.

- As each sample of a test is scored, data are stored within this central file.
- Data shall be aggregated for a given test, as each test sample is scored, up to the maximum number of samples designated by the test developer.
- Data shall be extracted for a given test for the purpose of analyzing the test and its test items.

DATA SOURCE: Performance Evaluation Component (see DFD 2.2.3)

STRUCTURE: An on-line file which shall include the following data for each test:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies a particular test, including the behavioral objective ID to which the test mainly applies and the test ID.
Dates of Administration	Range of dates during which the test samples were scored.
Number of Samples	Number of test samples scored.
Test Item Identification Data	Data identifying each test item incorporated in the test, to include the behavioral objective Id and test item ID.

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DATA STORE: E6, Consolidated Test Score Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
-------------------	---------------------

Performance Test Score Data

- | | |
|-----------------------|--|
| - Pass/Fail Data | Total number of test failures. |
| - Step Pass/Fail Data | Number of steps failed by each examinee, specific steps failed, number of steps unobserved, specific steps unobserved. |
| - Critical Step | Critical steps failed, number of times each critical step was failed. |

Knowledge Test Score Data

- | | |
|-----------------------------|---|
| - Pass/Fail Data | Total number of test failures. |
| - Percentage Correct | Percentage of correct items on each test administration. |
| - Incorrect Items | Identification of test items failed and number of failures on each item. |
| - Response Alternative Data | Response alternatives selected on each item and number of times each response alternative was selected. |
| - Objectives Failed | Identification of failed objectives and and number of times each objective was failed. |
| - Critical Items | Identification of failed critical items and number of times that each was failed. |

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DATA STORE: E7, Test Key File

DESCRIPTION: A file which contains data from which the most current Test Item Analysis Key listing is produced. Data in the file are sorted by objective ID. From this file, a listing is produced which aligns test identification data and test keys to enable the analyses of any test existing in the AOTS.

DATA SOURCE: DFD 2.1, Process 3
DFD 2.1.3, Process 2
DFD 2.1.3.2, Process 2
DFD 2.1.3.2.2, Process 1

STRUCTURE: An on-line file which shall contain:

<u>Data Item</u>	<u>Description</u>
Objective IDs	The behavioral objective IDs which apply to objectives for which one or more tests exist for analysis. Each Objective ID is a numeric.
Test IDs	The test IDs which apply to tests existing for analysis. Each test ID is a numeric.
Test Keys	The keys which apply to tests existing for analysis. Each test key is a sequential array of six numeric, one or two digit, codes that must be input via the keyboard to perform an analysis of the respective test and its test items.

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20.3 Performance Evaluation Component Processes.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.2, Evaluate Performance

LEVEL OF AUTOMATION: Manual, automated, automatic

DESCRIPTION: This process shall enable the evaluation of trainees' knowledge and performance abilities with regards to AFS task training and certification. This process involves the administration and scoring of AFS task knowledge and performance tests; and shall support pre-training, post-training and Quality Control (QC) evaluations. This process shall also enable the control/accountability of offline evaluation materials.

DATA INPUT: Evaluation Events Data
Test Items Data
Tests Data
Evaluation Materials for Accountability

DATA OUTPUT: Knowledge Test Results Notices
Failed QC Evaluation Notices
Evaluation Results Data

STRUCTURE: This process includes the following subprocesses:

- Process 2.2.1, Administer Knowledge Test On line
- Process 2.2.2, Administer Evaluation Off line
- Process 2.2.3, Score Test and Provide Feedback
- Process 2.2.4, Account for Off-Line Evaluation Materials

Page 1 of 2

PROCESS: 2.2.1, Administer Knowledge Test On Line

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable the administration of a knowledge test on line. On-line administration of a test shall include:

1. Automatic presentation of on-line test instructions,
2. Automatic presentation of questions (one at a time),
3. Ability for trainee to mark one or more questions for review,
4. Ability for trainee to select one or more answers for each question and change the answer for any question,
5. Ability for trainee to review all questions or only marked questions, before test is automatically scored, and
6. Automatic timing while the trainee accomplishes the test (to preclude a trainee from taking longer than the period of time as determined by the test developer).

The system shall enable a trainee to take a knowledge test on line, under the following conditions:

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PROCESS: Administer Knowledge Test On Line (continued)

DESCRIPTION: (continued)

- The trainee uses the AOTS to determine his/her next AFS task training requirement, whereby the system automatically schedules an evaluation event. The on-line event shall occur for a task or subtask which:
 - is identified as the trainee's next training requirement,
 - an on-line knowledge test exists in the AOTS, and
 - the trainee has completed the respective knowledge training or is being evaluated for pre-training purposes (to determine the individual's need for task training).

The system shall automatically extract the appropriate test and test item data, based on specific evaluation event data such as the Task ID, Subtask ID (if appropriate), and Objective ID.

Once the trainee answers all questions and completes all desired reviews, or once the time period expires for accomplishing the test, the test and test item data, and trainee's responses, shall then be used for automatic scoring of the test.

DATA INPUT: Evaluation Event Data
Test Data
Test Item Data

DATA OUTPUT: Selected Responses

STRUCTURE: N/A

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PROCESS: 2.2.2, Administer Evaluation Off Line

LEVEL OF AUTOMATION: Manual, Automated

DESCRIPTION: This process shall enable an evaluator to administer a knowledge or performance test off line. A knowledge test shall be administered for evaluating AFS task knowledge; a performance test shall be administered for evaluating AFS task performance/skills or for conducting a Quality Control (QC) evaluation.

For an off-line knowledge test, this process shall involve:

1. Printing the required number of copies of the test (not to exceed 75 copies; one copy for each trainee participating in the evaluation event),
2. Printing the score key (if desired for feedback purposes once the test is scored),
3. Presenting a hard copy of the test and blank answer sheet to the appropriate trainee(s),
4. Monitoring the testing process, and
5. Collecting each test copy and completed answer sheet at the conclusion of the testing.

For an off-line performance test, this process shall involve:

1. Printing the required number of copies of the test (not to exceed 75 copies; one copy for each trainee participating in the evaluation event),
2. Following the evaluator's instructions provided in the Oral Test Guide (OTG),

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PROCESS: Administer Evaluation Off Line (continued)

DESCRIPTION: (continued)

3. Conducting the evaluation for each person, i.e., trainee performs steps or product is produced, as required by the Performance Evaluation Checklist (PEC), and
4. Observing and recording observations for each person, using (copies of) the PEC.

An off-line evaluation shall be administered once an evaluation event has been scheduled for one or more trainees for a given task or subtask. The following conditions shall be met:

For a task knowledge evaluation -

1. An off-line knowledge test exists in the AOTS for the task/subtask and
2. Each trainee has completed the respective knowledge training for the task/subtask, or has been scheduled for pre-training evaluation to determine the need for training.

For a task performance evaluation -

1. A performance test exists in the AOTS for the task and
2. Each trainee has completed the respective performance training for the task/subtask, or has been scheduled for pre-training evaluation to determine the need for training.

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PROCESS: Administer Evaluation Off Line (continued)

DESCRIPTION: (continued)

For a Quality Control (QC) evaluation -

1. A performance test exists in the AOTS for the task/subtask and
2. The task, evaluatee and evaluator(s) meet QC selection criteria (see process 2.4.1).

The printing of off-line evaluation materials shall be permitted at the time the evaluation event is scheduled, or anytime thereafter, upon request.

- The system shall automatically extract the appropriate test and test item data, based on specific evaluation event data (such as Task ID, Subtask ID, and Behavioral Objective ID).
- Test material accountability data shall be automatically maintained as soon as evaluation materials are printed for off-line use.
- Additionally, a Test Control Number (TCN) shall be automatically established and printed on each copy of the test and the corresponding score key (score key applies only to a knowledge test).

Once an off-line test has been administered, test data, test item data and each trainee's responses/evaluator's observation results shall then be used for scoring each copy of the test and updating the accountability of the test materials.

DATA INPUT: Evaluation Event Data
Test Data
Test Item Data

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PROCESS: Administer Evaluation Off Line (continued)

DATA OUTPUT: Selected Responses
Log Record Test Data
Knowledge Test Score Key

STRUCTURE: N/A

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PROCESS: 2.2.3, Score Test and Provide Feedback

LEVEL OF AUTOMATION: Automated, automatic, manual

DESCRIPTION: This process shall enable an on-line or off-line knowledge or performance test to be scored, and feedback to be provided to each appropriate trainee.

A knowledge test which is administered on line shall be automatically scored. The correct answer for each knowledge test item shall be matched with the trainee's response. The items missed shall be "flagged", to enable feedback to be presented to the trainee during the scoring process. The total score shall be provided online to the trainee, as well as the overall test results of "passed" or "failed", as appropriate.

- Overall test results shall also be passed to the Management Subsystem, to update the trainee's ATR and to notify necessary individuals of the completion/overall results of the evaluation.
- Test scoring data shall be maintained, to enable future analysis and validation of the test and its test items.

A knowledge test or performance test which is administered off line shall be scored in one of two ways:

1. Reading the completed answer sheet(s) into an Optical Mark Reader (OMR), or
2. Entering test identification data and each trainee's responses/evaluator's observations via the keyboard.

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PROCESS: Score Test and Provide Feedback (continued)

DESCRIPTION: (continued)

Answer sheets shall be developed which will enable the scoring of off-line tests to occur via an OMR or keyboard input. One type of answer sheet shall be developed for scoring knowledge tests, while another type shall be developed for performance tests. An answer sheet shall contain:

1. Test Identification Blocks (trainee or evaluator records data and/or fills in blocks or bubbles to represent the Test Control Number, trainee, testing date, and evaluator) and
2. Response bubbles (trainee fills in bubble(s) which identifies the correct answer for each test item of a knowledge test; or an evaluator fills in bubbles which identifies the observance of each PEC step for a performance test).

When a knowledge test answer sheet is scored either by using an OMR or by keyboard input, test results shall be automatically printed to the trainee's supervisor. These test results shall identify the trainee, event, task, date test was taken, test score, overall pass/fail result and each test item missed.

- The overall test results shall be passed to the Management Subsystem, to update the trainee's ATR and to notify necessary individuals of the completion and overall results of the evaluation.
- In addition, the supervisor shall use the knowledge test score key (previously printed to administer the evaluation) to identify the correct answer(s) to each missed item and to provide the appropriate feedback to the trainee.

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PROCESS: Score Test and Provide Feedback (continued)

DESCRIPTION: (continued)

When a performance test answer sheet is scored by using an OMR or keyboard input, the overall test results shall be passed to the Management Subsystem, to update the trainee's ATR and to notify the necessary individuals of the completion and overall results of the evaluation.

- A Quality Control (QC) Failure Notice shall be automatically generated to a trainee's Unit Commander if the performance test is administered for the purpose of conducting a QC evaluation and the trainee fails the evaluation. This notice shall advise the commander that the trainee failed the QC evaluation and is recommended for decertification and remedial training before recertification.

When a knowledge or performance test answer sheet is scored by using an OMR or by keyboard input, test score data shall be automatically maintained, to enable future analysis and validation of the test and its test items.

- Overall test results (passed/failed) shall also be used for automatic accountability of the offline materials (to identify that a specific test for a given individual has been administered and scored).

DATA INPUT: Test Data
Test Item Data
Selected Responses
Knowledge Test Score Key

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PROCESS: Score Test and Provide Feedback (continued)

DATA OUTPUT: Knowledge Test Results Notice
Failed QC Evaluation Notice
Test Score Data
Evaluation Results Data
Pass-Fail Log Data

STRUCTURE: N/A

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PROCESS: 2.2.4, Account For Off-line Evaluation Materials

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a Test Control Officer, or other designated individuals, to control and maintain accountability of off-line evaluation materials (copies of tests, completed answer sheets, score keys, etc.).

- On-line capabilities shall be provided to monitor the receipt, administration and timely disposition of offline evaluation materials.
- Off-line procedures shall be developed and documented which describe the ways in which Test Control Officers (TCOs)/other designated persons shall manage and control the actual receipt, administration and disposition of the off-line evaluation materials.

An on-line log record shall be automatically generated each time an evaluation event is scheduled and the evaluation materials for the event are printed for off-line administration. The log record shall be used to monitor accountability of the offline materials and shall include:

1. Event/test data (Task ID, Objective ID, Event ID, Test ID, Test Control Number, type of test, date test was printed, test requestor's name, evaluator's name and number of test copies printed),
2. Trainee data (trainee identification data - name and SSAN; and overall test results data - none/passed/failed) for each trainee participating in the evaluation event, and
3. Test accountability data (suspense date and test disposition status).

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PROCESS: Account for Off-line Evaluation Materials
(continued)

DESCRIPTION: (continued)

Data for each log record shall be updated and maintained in the following ways:

1. Event/test data shall be automatically updated once the evaluation event is scheduled and the evaluation materials are printed. Event/test data shall be maintained until the log record is deleted.
2. Trainee data shall be automatically updated when the event is scheduled and the evaluation materials are printed. Also, trainee data shall be automatically updated once scoring of the test for each trainee has occurred. Trainee data shall be maintained until the log record is deleted.
3. Test accountability data shall be initially automatically updated; and shall be updated by the Test Control Officer or other designated persons as necessary to maintain an accurate account of the materials.
The following data shall apply:
 - a. The suspense date for final disposition of materials (automatically established as seven days from date materials are printed), and
 - b. The disposition status of the materials.

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PROCESS: Account for Off-line Evaluation Materials
(continued)

DESCRIPTION: (continued)

NOTE: The disposition status, for each trainee, shall be automatically established as "outstanding" when the materials are printed. Once each trainee's copy of the test is scored (via an Optical Mark Reader or keyboard input), the disposition status for that trainee shall be automatically updated to "administered". When appropriate, the Test Control Officer/other designated persons shall update the disposition status to "destroyed" or "stored".

4. Once all copies of a test for a given evaluation event have been updated as being destroyed or stored, the log record has no further value and shall be automatically deleted.

Log Records shall be able to be printed or reviewed online, upon request by an authorized person (such as TCO, evaluator, supervisor).

For details pertaining to the control, management and disposition of off-line evaluation materials, refer to the Off-line Evaluation Materials Accountability Procedures documentation, (not included within these specifications).

DATA INPUT: Evaluation Event Data
Log Record Test Data
Pass-Fail Log Data
Evaluation Materials for Accountability
Event Log Record

DATA OUTPUT: Event Log Record

STRUCTURE: N/A

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20.3.1 Performance Evaluation Component Data Flows.

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DATA FLOW: Evaluation Event Data

DESCRIPTION: Data defining a scheduled and generated evaluation event for an AFS task or a Quality Control (QC) evaluation. These data are used for administering a knowledge test on line, administering a knowledge or performance test off line and accounting for off-line evaluation materials. Event data shall enable the appropriate evaluation materials to be presented to, and managed by, the appropriate personnel.

DATA SOURCE: External Entity 1.3

DATA DESTINATION: DFD 2.2, Process 1, 2 and 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
------------------	--------------------

Event Identification Data

- | | |
|----------------|---|
| - Event Number | The unique event number automatically assigned by the system for the event. |
| - AOTS Task ID | ID of the task for which the evaluation event applies. The ID shall be an alpha/numeric string of six characters. |
| - Task Level | The level of the task for which the evaluation applies. This code will either be a T (to designate task level) or the respective Subtask ID (to designate the appropriate subtask). |
| - Objective ID | ID of the objective for which the evaluation event applies. The ID is a unique numeric. |

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DATA FLOW: Evaluation Event Data (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Event Identification Data (continued)

- Type of Evaluation Event	Designation of the evaluation event type: AFS task knowledge or performance evaluation event or Q C evaluation event.
Event Date/Times	Date and time the event is scheduled to begin and end, if scheduled for a specific timeframe. Dates shall be in the DDMMYYYY format; times shall be in the military time format (0830, 1400, 2300, etc.).
Evaluator's ID	SSAN, name and rank of the designated evaluator.
Trainee(s) ID	SSAN, name and rank of each individual being evaluated.
Test ID	The numeric ID of the test which is to be administered during the evaluation event.
Administration Data	The designation of whether the test is to be administered on line or off line. (Only applies if test is a knowledge test; a performance test is always administered off line.)

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DATA FLOW: Evaluation Materials for Accountability

DESCRIPTION: Evaluation materials which were used to administer and score an off-line knowledge or performance test to one or more trainees for a given task knowledge evaluation, task performance evaluation or a Quality Control (QC) evaluation event. These materials are received from the operational unit by the Test Control Officer (TCO), who shall then update the disposition status of the evaluation materials for each trainee who was evaluated.

DATA SOURCE: External Entity 5

DATA DESTINATION: DFD 2.2, Process 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Copies	The hard copies of the test which had been printed. (One copy for each trainee who was evaluated.)
Knowledge Test Score Key	The score key which was used to provide feedback to a trainee who misses one or more test items on a knowledge test.
Completed Answer Sheet(s)	The AOTS answer sheet which was used to administer and/or score the test for each trainee.

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DATA FLOW: Evaluation Results Data

DESCRIPTION: Overall test results that are automatically passed to processes within the Management Subsystem whenever an on-line or off-line test is scored for an individual (using an OMR or keyboard). These data initiate automatic processes that update relevant management and training records, and notify appropriate persons of the completion and overall results of the evaluation. This data flow applies to the results of a Quality Control (QC) evaluation or an AFS task evaluation.

DATA SOURCE: DFD 2.2, Process 3

DATA DESTINATION: External Entity 1.2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies the particular test which was scored, to include the respective behavioral objective ID and test ID.
Trainee's ID	SSAN, name and rank of the trainee who took the test/performed the evaluation.
Evaluator's ID	SSAN, name and rank of the evaluator who administered the test (off-line test only).
Overall Test Results	The "passed" or "failed" results for the trainee.

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DATA FLOW: Event Log Record

DESCRIPTION: An on-line log record which is automatically established once an evaluation event has been scheduled and the respective evaluation materials have been printed for off-line administration. The log record shall be used to monitor the accountability of the off-line materials. The log record shall be maintained with other existing log records; some data for the log record shall be updated automatically by the system (ie., when the test is scored for a trainee); other data shall be updated by a Test Control Officer (TCO) or other designated individuals. The log record shall exist until data is updated reflecting the final disposition of all appropriate training materials. A TCO, and other designated individuals, shall be able to review the log record on line, print the log record or update data for the log record.

DATA SOURCE: DFD 2.2, Process 4 and Data Store E5

DATA DESTINATION: DFD 2.2, Data Store E5 and Process 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Event/Test Data	Data which are automatically updated once the evaluation event is scheduled for which off-line materials have been printed. Such data will include: AOTS Task ID, Subtask ID (if appropriate), Behavioral Objective ID, Test ID, Test Control Number, type of test, date test copies were printed, test requestor's ID, evaluator's ID and number of test copies printed.

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DATA FLOW: Event Log Record (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Trainee Data

SSAN, name, and rank of each airmen being evaluated and the overall test results (none/passed/failed) for each.

Test Accountability Data

- Suspense Data

Date (DDMMYYYY) when the evaluation materials are suspended for final disposition. This date shall be automatically established as 7 days from the date the materials are printed.

- Test Disposition
Status

The current status of the evaluation materials for each trainee. The status shall be automatically established as "outstanding" once materials are printed; shall be automatically updated to "administered" once the test has been scored; and shall be updated by the TCO, or other designated individuals, to "stored" or "destroyed" once appropriate disposition of the materials has been accomplished.

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DATA FLOW: Failed QC Evaluation Notice

DESCRIPTION: A notice automatically printed to a trainee's Unit Commander when the trainee fails a Quality Control (QC) evaluation. This notice advises that the trainee was found to be unqualified for a particular task and is recommended for task decertification and remedial training before recertification.

DATA SOURCE: DFD 2.2, Process 3

DATA DESTINATION: External Entity 5

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Notice Date	DDMMYYYY notice was printed (same day test was scored).
Trainee's ID	Name, rank and SSAN of the trainee who failed the QC evaluation.
QC Task Data	AOTS Task ID and task statement which applies to the task for which the individual was QC-evaluated.
Notice Explanation/ Recommendation	The text which explains the purpose for the notice.

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DATA FLOW: Knowledge Test Results Notice

DESCRIPTION: A hardcopy notice which details an individual's results of a knowledge test administered off line. The notice shall be automatically printed to the trainee's supervisor, once the individual's test has been scored (using an OMR or the keyboard).

DATA SOURCE: DFD 2.2, Process 3

DATA DESTINATION: External Entity 5

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Trainee's ID	SSAN, name, and rank of the trainee who took the test.
Event/Test Identification Data	Data which includes the: evaluator's name, Event ID, Test Control Number, event-specific data (Task ID, task level, Objective ID, type of event and Test ID), task/subtask statement and date test was taken.
Test score data	Percent of correct responses by test and by objective, pass/fail for total test, pass/fail by objective, and test item ID for each incorrectly answered item.

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DATA FLOW: Knowledge Test Score Key

DESCRIPTION: A printed score key for a particular knowledge test which was administered off line. The key shall be used by a trainee's supervisor, to provide feedback on missed test items, once the test is scored. The key contains the correct answer(s) for each test item included in the test.

DATA SOURCE: DFD 2.2, Process 2

DATA DESTINATION: DFD 2.2, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Print Date	DDMMYYYY the test copies and test score key are printed.
Test Control Number (TCN)	Number automatically assigned by the system to control the evaluation materials which are printed.
Correct Answers	The correct answer(s) for each test item included in the test.

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DATA FLOW: Log Record Test Data

DESCRIPTION: Test identification and other data required to account for the distribution and disposition of evaluation materials printed for off-line administration. These data shall be automatically updated, to create an on-line event log record, once an offline evaluation has been scheduled and the evaluation materials have been printed.

DATA SOURCE: DFD 2.2, Process 2

DATA DESTINATION: DFD 2.2, Process 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Control Number (TCN)	Number automatically assigned by the system to control the evaluation materials which were printed. The TCN shall not exceed 999.
Type of Test	"Performance" or "knowledge".
Number of Copies	Number of test copies printed for the event. The number of copies should equal the number of trainees who are participating in the evaluation event.
Test Print Date	DDMMYYYY the evaluation materials were printed for offline administration.

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Date: 31 October 1989

DATA FLOW: Pass-Fail Log Data

DESCRIPTION: Data which identifies the overall test results for an individual who was administered an off-line knowledge or performance test. "Passed" or "failed" shall be automatically recorded on the respective log record when a trainee's test is scored; this data shall also cause the log record test status to be automatically updated from "outstanding" to "administered".

DATA SOURCE: DFD 2.2, Process 3

DATA DESTINATION: DFD 2.2, Process 4

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Trainee's ID	SSAN, name, and rank of the trainee for which the test was scored.
Test Control Number (TCN)	Number automatically assigned by the system to control the evaluation materials which were printed.
Pass/Fail Information	"Passed" or "failed", as appropriate.

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DATA FLOW: Selected Responses

DESCRIPTION: The trainee's selected responses to knowledge test items or the evaluator's recorded observations for a performance test. These data shall be recorded automatically (if the knowledge test was administered on line) or shall be recorded on an answer sheet (if the knowledge/performance test was administered off line). The selected answers shall be used, with other test/test item data, to score the test.

DATA SOURCE: DFD 2.2, Process 1 and 2

DATA DESTINATION: DFD 2.2, Process 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Examinee ID	SSAN, name, and rank of the examinee.
Evaluator ID	SSAN, name, and rank of the evaluator.
Examinee's Response Data	The examinee's response to each item on a particular knowledge test. (Knowledge test only.)
Evaluator's Observations	The evaluator's observations of the trainee's performance or product. The evaluator shall be required to record an overall "pass" or "fail" observation; the evaluator may also record observations of each step contained in the Performance Evaluation Checklist (PEC). (Performance test only.)

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DATA FLOW: Test Data

DESCRIPTION: Complete specifications developed or revised for a particular performance or knowledge test.

Test data result from processes performed by the Evaluation Instrument Management Component (2.1); are extracted from the consolidated test data file (Data Store E4); and are used for processes within the Performance Evaluation Component (administering a knowledge test on line, administering a knowledge/performance test off line and scoring a test).

DATA SOURCE: Data Store E4

DATA DESTINATION: DFD 2.2, Process 1, 2, 3

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies the test being administered or scored, to include the behavioral objective ID for which the test applies and the test ID.
Selected Objectives and Test Items	Behavioral objectives and test items selected for inclusion in the test. Behavioral objectives are identified by BO IDs; test items are identified by BO ID and Test Item ID.
Test Format Data <ul style="list-style-type: none">- Order of Items	Order in which the items will appear in the test at presentation (if the item scrambling option in the test parameters has not been invoked).
<ul style="list-style-type: none">- Critical Items	Items designated as critical items.

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DATA FLOW: Test Data (continued)

STRUCTURE: (continued)

<u>Data Item</u>	<u>Description</u>
------------------	--------------------

Test Format Data (continued)

- | | |
|------------------|---|
| - Pass Criterion | (Knowledge test only) Number of correct responses required to achieve a passing score on the objective. |
|------------------|---|

Test Parameter Data

- | | |
|----------------------------|---|
| - Test Use | Designation that the test is either the primary test of its type (performance or knowledge) or an alternate test. |
| - Item Analysis | Item analysis capability enabled or disabled. Default shall be enabled. |
| - Maximum Analysis Samples | Maximum number of samples of test scores that will stored by the system for use in item analysis. Range shall be 30 to 100; default shall be 50. |
| - Time Allowed | (Knowledge tests only) Time allowed the airman for completing the test. Range shall be 1 to 1440 minutes; default shall be 60 minutes. |
| - Item Scrambling | (Knowledge tests only) Enable or disable scrambling of items at presentation. Default shall be disabled. |
| - Test Interruption | (Knowledge tests only) Interruption to be allowed/disallowed during testing. Default shall be allowed. |
| - Test Item Recap | (Knowledge tests only) Recapitulation of missed test items with correct response displayed to be allowed/disallowed during online testing. Default shall be disallowed. |

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DATA FLOW: Test Data (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Test Instructions

(Knowledge test only). Instructions
which include the test purpose and
testing procedures.

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DATA FLOW: Test Item Data

DESCRIPTION: Data pertaining to a particular test item, to include: test item identification data and test item contents (text and item specifications).

Test data result from processes performed by the Evaluation Instrument Management Component (2.1); are extracted from the Test Item Bank (Data Store E3); and are used for processes within the Performance Evaluation Component (administering a knowledge test on line, administering a knowledge/performance test off line and scoring a test).

DATA SOURCE: Data Store E3

DATA DESTINATION: DFD 2.2, Process 1, 2 and 3

STRUCTURE: Data elements include:

<u>Data Item</u>	<u>Description</u>
Test Item Identification Data	Data that identifies a particular test item, including task/subtask ID, behavioral objective ID and test item ID.
Test Item Type	Oral test guide (OTG), performance evaluation checklist (PEC), or any of the eight types of knowledge test items: true/false, multiple choice, list multiple choice, matching, constructed response, limited constructed response, single area touch, or sequence touch.
Test Item Contents	Test item text and specifications. The contents depend on the type of test item. Refer to the data flows titled: OTG, PEC or Knowledge Test Item, for descriptions of test item contents data.

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DATA FLOW: Test Sample Score Data

DESCRIPTION: Data which result from scoring a given sample of a knowledge or performance test.

Test score data shall be stored for later use by the Evaluation Instrument Management Component (2.1), for analyzing the test and its test items to validate the materials.

Some test score data applies to either a performance or a knowledge test; other test score data depends on the type of test scored.

DATA SOURCE: DFD 2.2, Process 3

DATA DESTINATION: DFD 2.1, Data Store E6

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data identifying the specific test, to include the task ID, subtask ID (if applicable), behavioral objective ID and test ID.
Date of Administration	DDMMYYYY in which the test sample was scored.
Test Item Identification Data	Data identifying each test item incorporated in the test, to include the behavioral objective ID and test item ID.

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DATA FLOW: Test Sample Score Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
-------------------	---------------------

Performance Test Score Data

- | | |
|-----------------------|---|
| - Pass/Fail Data | The designation of whether examinee passed or failed test. |
| - Step Pass/Fail Data | Number of steps failed by the examinee, specific steps failed, number of steps unobserved, specific steps unobserved. |
| - Critical Step | Critical steps failed, number of times each critical step was failed. |

Knowledge Test Score Data

- | | |
|-----------------------------|--|
| - Pass/Fail Data | The designation of whether the examinee passed or failed the test. |
| - Percentage Correct | Percentage of items the examinee answered correctly. |
| - Incorrect Items | Identification of test items failed. |
| - Response Alternative Data | Response alternatives selected for each item. |
| - Objectives Failed | Identification of failed objectives. |
| - Critical Items | Identification of failed critical items. |

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20.3.2 Performance Evaluation Component Data Stores.

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DATA STORE: E3, Test Item Bank

DESCRIPTION: The central depository of all data for all test items (Oral Test Guides, Performance Evaluation Checklists and knowledge test items) that have been developed or revised.

- As data for each test item are developed, the data are stored within this central data store; as data are revised, the existing data are extracted from the file and replaced by the revised data.
- Test item identification data, the test item contents and references which apply to each test item are stored within this file.
- Once a test item is deleted, all data for that test item shall automatically be deleted from this data store.

DATA SOURCE: Evaluation Instrument Management Component (2.1)

STRUCTURE: An on-line file which shall include the following data for each test item:

Data Item

Description

Test Item
Identification
Data

Data that identifies a particular test item, including the behavioral objective ID to which the test item applies and the test item ID.

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DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Test Item Type

Oral test guide (OTG), performance evaluation checklist (PEC), or any of the eight types of knowledge test items: true/false, multiple choice, list multiple choice, matching, constructed response, limited constructed response, single area touch, or sequence touch.

Test Item Contents

Test item text and specifications. The contents depend on the type of test item:

- OTG contents

-- Behavioral
Objective
Statement

The complete behavioral objective statement for which the OTG applies.

-- Evaluator
Info

Information to be used by an evaluator to help prepare for a specific task or Quality Control evaluation. Such information will include: estimated time to conduct the evaluation; prerequisite tasks which should be trained and evaluated before the evaluation is conducted; whether the task is performed by one individual or by a team; the tools, equipment and materials (TEMs) required by the evaluatee; the TEMs required by the evaluator; and any conditions under which the evaluation must be conducted.

-- Evaluator
Instructions

Guidelines for administering the performance evaluation, including the wording of the spoken instructions that the evaluator will say to the airman/trainee.

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DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
-------------------	---------------------

Test Item Contents (continued)

- | | |
|--------------------------------|--|
| - PEC contents | |
| -- PEC steps | The text for each PEC step. There shall be a maximum of 60 steps. |
| - Knowledge Test Item contents | |
| -- Item Stem | The statement/question setting forth the situation to which an examinee must respond. The stem may contain up to three graphics.
Data Type: Alpha/numeric string, not to exceed 3600 characters/spaces. |
| -- Graphics Data (optional) | |
| Graphic ID(s) | Alphanumeric name(s) or code(s) used to call up the graphic(s) selected by the test developer/reviser for use in the test item stem. Up to three graphic IDs can be specified.
Data Type: Alpha/numeric string, not to exceed 10 characters/spaces. |
| Graphic(s) | The actual graphic(s) selected by the developer/reviser. Up to three graphics can exist for the test item stem. |
| Presentation Specifications | Specifications defined by the test item developer/reviser concerning the placement, scaling, rotation and coloring of each selected graphic.
Data Type: X/Y coordinates for placement data; numeric (1-10) for scaling factor; numeric (0-360 degrees) for rotation data; and numeric (0-8) for color data. |

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DATA STORE: E3, Test Item Bank (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Knowledge Test Item Contents (continued)

-- Response
Alternatives

Response alternatives to the situation posed in the item stem that are defined by the test item developer/reviser. Data Type for alternatives depends on the type of knowledge test item.

-- Correct
Answer(s)

Response alternative(s) designated by the test item developer/reviser as the correct response to the item stem. Data Type for correct answer(s) depends on the type of knowledge test item.

-- Feedback

Comments by the test item developer or reviser for each response alternative. Data Type: Alpha/numeric string, not to exceed 240 characters.

Test Item References
and Breakdowns

Titles, identification codes, and breakdowns of the publications that specify performance and proficiency requirements applicable to the test item.

Test IDs

The unique numerical test IDs for tests which incorporate the test item.

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DATA STORE: E4, Consolidated Test Data

DESCRIPTION: The central depository of all data for all tests that have been developed or revised.

- As data for each test are developed, the data shall be stored within this file; as data are revised, the existing data are extracted from this file and replaced by the revised data.
- Test identification data, applicable objectives and test items, test format data and test parameter data which apply to each test shall be stored within this file. Additionally, for each knowledge test, the on-line/off-line instructions shall also be included within this file.
- Once a test is deleted, all data for that test shall automatically be deleted from this datastore.

DATA SOURCE: Evaluation Instrument Management Component (2.1)

STRUCTURE: An on-line file which shall include the following data for each test:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies a particular test, including the behavioral objective ID to which the test mainly applies and the test ID.

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DATA STORE: E4, Consolidated Test Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Selected Objectives and Test Items	Behavioral objectives and test items selected for inclusion in the test. Each behavioral objective is identified by its respective BO ID; each test item is identified by its respective Test Item ID.
Test Format Data	
- Order of Items	Order in which the items will appear in the test at presentation (if the item scrambling option in the test parameters has not been invoked).
- Critical Items	Items designated as critical items.
- Pass Criterion	(Knowledge test only) Number of correct responses required to achieve a passing score on the objective.
Test Parameter Data	
- Test Use	Designation that the test is either the primary test of its type (performance or knowledge) or an alternate test.
- Item Analysis	Item analysis capability enabled or disabled. Default shall be enabled.
- Maximum Analysis Samples	Maximum number of samples of test scores that will be stored by the system for use in item analysis. Range shall be 30 to 100; default shall be 50.
- Time Allowed	(Knowledge tests only) Time allowed the airman for completing the test. Range shall be 1 to 1440 minutes; default shall be 60 minutes.

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DATA STORE: E4, Consolidated Test Data (continued)

STRUCTURE: (continued)

Data Items

Descriptions

Test Parameter Data (continued)

- Item Scrambling (Knowledge tests only) Enable or disable scrambling of items at presentation. Default shall be disabled.
- Test Interruption (Knowledge tests only) Interruption to be allowed/disallowed during testing. Default shall be allowed.
- Test Item Recap (Knowledge tests only) Recapitulation of missed test items with correct response displayed to be allowed/disallowed during online testing. Default shall be disallowed.

Test Instructions :

(Knowledge test only). Instructions which include the test purpose and testing procedures.

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DATA STORE: E5, Consolidated Log Records

DESCRIPTION: A file containing log records which apply to evaluation events for which evaluation materials have been printed for off-line administration and scoring. Each log record shall be maintained until the Test Control Officer (TCO), or another designated individual, updates the final disposition data for the evaluation materials.

DATA SOURCE: DFD 2.2, Process 4

STRUCTURE: The structure shall enable on-line maintainability of each event log record. This datastore is an aggregation of all existing Event Log Records. For each log record, data items shall include:

Data Item

Description

Event/Test Data

Data which are automatically updated once the evaluation event is scheduled for which off-line materials have been printed. Such data will include: AOTS Task ID, Subtask ID (if appropriate), Behavioral Objective ID, Test ID, Test Control Number, type of test, date test copies were printed, test requestor's ID, evaluator's ID and number of test copies printed.

Trainee Data

SSAN, name, and rank of each airmen being evaluated and the overall test results (none/passed/failed) for each.

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DATA STORE: E5, Consolidated Log Records (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
-------------------	---------------------

Test Accountability Data

- | | |
|--------------------|---|
| - Suspense Data | Date (DDMMYYYY) when the evaluation materials are suspended for final disposition. This date shall be automatically established as 7 days from the date the materials are printed. |
| - Test Disposition | |
| - Status | The current status of the evaluation materials for each trainee. The status shall be automatically established as "outstanding" once materials are printed; shall be automatically updated to "administered" once the test has been scored; and shall be updated by the TCO, or other designated individuals, to "stored" or "destroyed" once appropriate disposition of the materials has been accomplished. |

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DATA STORE: E6, Consolidated Test Score Data

DESCRIPTION: Data stored for all knowledge and performance tests which have been scored using an AOTS keyboard or an Optical Mark Reader.

- As each sample of a test is scored, data are stored within this central file.
- Data shall be aggregated for a given test, as each test sample is scored, up to the maximum number of samples designated by the test developer.
- Data shall be extracted for a given test for the purpose of analyzing the test and its test items.

DATA SOURCE: DFD 2.2, Process 3

STRUCTURE: An on-line file which shall include the following data for each test:

<u>Data Item</u>	<u>Description</u>
Test Identification Data	Data that identifies a particular test, including the behavioral objective ID to which the test mainly applies and the test ID.
Dates of Administration	Range of dates during which the test samples were scored.
Number of Samples	Number of test samples scored.
Test Item Identification Data	Data identifying each test item incorporated in the test, to include the behavioral objective Id and test item ID.

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DATA STORE: E6, Consolidated Test Score Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
-------------------	---------------------

Performance Test Score Data

- | | |
|-----------------------|--|
| - Pass/Fail Data | Total number of test failures. |
| - Step Pass/Fail Data | Number of steps failed by each examinee, specific steps failed, number of steps unobserved, specific steps unobserved. |
| - Critical Step | Critical steps failed, number of times each critical step was failed. |

Knowledge Test Score Data

- | | |
|-----------------------------|---|
| - Pass/Fail Data | Total number of test failures. |
| - Percentage Correct | Percentage of correct items on each test administration. |
| - Incorrect Items | Identification of test items failed and number of failures on each item. |
| - Response Alternative Data | Response alternatives selected on each item and number of times each response alternative was selected. |
| - Objectives Failed | Identification of failed objectives and number of times each objective was failed. |
| - Critical Items | Identification of failed critical items and number of times that each was failed. |

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20.4 Training Quality Control Component Processes.

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PROCESS: 2.3, Apply Training Quality Control

LEVEL OF AUTOMATION: Automated, Automatic, Manual

DESCRIPTION: This process shall provide for systematic task performance evaluations to assess effectiveness of AOTS training. This process involves evaluating individuals' ability to perform duty position tasks after tasks have been certified. Quality Control (QC) processing shall enable automatic or manual selection and identification of QC-candidate tasks, evaluatees and evaluators; as well as the ability for a QC Administrator to initiate a QC evaluation.

Automatic quality control processing shall involve both the Management Subsystem and the Evaluation Subsystem. The Management Subsystem shall provide the Evaluation Subsystem with the task Ids of tasks which are eligible for QC evaluation, as well as, task and individual qualification factors. The Training Quality Control Component shall periodically select tasks and qualified evaluatees and evaluators using algorithms which support QC selection criteria. A pre-determined number of evaluations shall be supported for each periodic QC selection process. When possible, these evaluation selections shall be spread across the AFSCs operating under the prototype AOTS. As each QC candidate task-evaluatee-evaluators combination is selected, a notice shall be generated to the appropriate QC Administrator. The QC Administrator shall use the notice to initiate the QC evaluation event.

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PROCESS: Apply Training Quality Control (continued)

DESCRIPTION: (continued)

This process shall also support the manual selection and identification of QC candidates. QC Administrators shall be allowed to initiate quality control evaluations at any time deemed appropriate, based on tasks, evaluatees and evaluators manually identified for QC processing.

The scheduling, administering and scoring processes that apply to an AFS task evaluation shall also apply for a QC evaluation (i.e., processes 1.3.2.2, 2.2.2 and 2.2.3).

- For each QC evaluation: event notices shall be printed to the evaluatee, evaluator(s), and the evaluatee's supervisor when the evaluation event is scheduled; the performance test shall be administered offline (using same evaluation materials used for evaluating task performance); and test score results shall be passed to the Management Subsystem to update the appropriate training management records and to notify the necessary individuals of the completion and overall results (pass/fail) of the evaluation. In addition, if a QC evaluation is failed, a notice shall be automatically generated to the evaluatee's Unit Commander. The notice shall advise the evaluatee has failed the QC evaluation and is recommended for decertification and remedial training before recertification.
- The scheduling, administration and scoring processes addressed above, as they pertain to QC evaluations, are not further described within this component - they have been described within the Management Subsystem (process 1.3.2.2) and the Performance Evaluation Component (processes 2.2.2 and 2.2.3).

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PROCESS: Apply Training Quality Control (continued)

DATA INPUT: QC Eligible Tasks
ATR Data for QC Evaluation Selections

DATA OUTPUT: QC Notices
QC Event Requirements Data

STRUCTURE: This process includes the following subprocesses:

- Process 2.3.1, Select QC Evaluation Candidates
- Process 2.3.2, Initiate QC Evaluation

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PROCESS: 2.3.1, Select QC Evaluation Candidates

LEVEL OF AUTOMATION: Automatic, Manual

DESCRIPTION: This process shall enable automatic or manual selection and identification of QC-candidate tasks, evaluatees and evaluators.

When performed manually, a QC Administrator shall determine the task, evaluatee and evaluators (primary and alternate) for a given quality control evaluation. QC candidates may be selected whenever considered appropriate by the QC Administrator.

On a periodic basis, the automatic QC selection process shall randomly identify eligible tasks, evaluatees and evaluators for QC evaluations. Specific data shall be consolidated, and algorithms shall be invoked, to accommodate Quality Control (QC) evaluation selection criteria.

To accomplish the automatic QC selection process, the Management Subsystem shall identify to the Training Quality Control Component the tasks which are eligible for quality control selection. These tasks meet preliminary criteria for quality control processing.

This process shall automatically select QC evaluatee candidates by examining training history data for each airmen in each AFS. If certified on a task within the past thirty days, an individual shall be selected as a potential evaluatee candidate; if the task is one that has been identified from the Management Subsystem as being an QC eligible task, the individual shall remain a potential evaluatee candidate for that task and the task shall remain a potential candidate for QC evaluation.

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PROCESS: Select QC Evaluation Candidates (continued)

DESCRIPTION: (continued)

This process shall automatically select primary and alternate QC evaluator candidates by examining training history data for each airmen in each AFS. If certified on a task, an evaluator shall be selected as a potential candidate; if the task is also an eligible task, the evaluator shall remain a potential candidate as a QC evaluator for that task and the task shall remain a potential candidate for QC evaluation.

This process shall then analyze and match data for the potential tasks, evaluatees and evaluators. The resulting match shall identify the task-evaluatee-evaluator combinations which are candidates for QC evaluations. Using algorithms, the following selection criteria shall be invoked for each task-evaluatee-evaluator combination:

For evaluatee-task selection:

1. Task must be on the Operational Position Task Requirements (OPTR) list against which the airman is assigned,
2. Evaluatee must not have been previously QC-evaluated on the task, and
3. Evaluatee must not have been QC-evaluated on any task within the past 30 days.

For evaluator-evaluatee-task selection:

1. The evaluator must be assigned to the same base/installation as the evaluatee,
2. The task must be one of the tasks appearing on the OPTR list against which the evaluator is assigned,

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PROCESS: Select QC Evaluation Candidates (continued)

DESCRIPTION: (continued)

3. The evaluator must not be the evaluatee's trainer or certifying official for the task,
4. The evaluator must not be selected as the QC-evaluatee for the task,
5. The evaluator must not have been selected as an evaluator for another task during the same time period, and
6. The evaluator must be of equal or higher rank than the evaluatee.

Selection criteria shall be invoked, and the matching process shall be continued, to enable the random selection of QC task-evaluatee-evaluator candidates to support a pre-specified number of QC evaluations (spread across AFSSs when possible).

- A notice shall be automatically generated to the appropriate QC Administrator when a valid task-evaluatee-evaluator combination is selected. The notice shall identify the task, evaluatee and the primary/alternate evaluators which meet the QC evaluation selection criteria (a primary evaluator shall be required; an alternate evaluator shall be optional). The QC Administrator shall then be able to initiate a QC evaluation based on the data provided by the notice.
- Data pertaining to each combination shall be stored for up to thirty days, to preclude re-selection of the QC candidates within the same thirty-day period.

DATA INPUT: ATR Data for QC Evaluation Selection
QC Eligible Tasks
QC Log Data

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PROCESS: Select QC Evaluation Candidates (continued)

DATA OUTPUT: QC Notice
QC Candidate Selection Data

STRUCTURE: N/A

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PROCESS: 2.3.2, Initiate QC Evaluation

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable a QC Administrator to update specific data to initiate a Quality Control (QC) evaluation.

The QC Administrator shall be able to initiate a QC evaluation at any time deemed appropriate by providing the system with the following data:

1. The Task ID which applies to the task to be evaluated,
2. The start/stop dates and times when the evaluation event is to occur,
3. The SSAN of the evaluatee,
4. The SSAN of the primary and alternate evaluator (alternate evaluator shall be optional).

This process shall enable a QC Administrator to initiate a QC evaluation for:

1. Task-evaluatee-evaluator(s) candidates identified by the automatic QC eligibility selection process (2.3.1) or
2. Task-evaluatee-evaluator(s) identified by some other means/manual process.

NOTE: When initiating a given QC evaluation which involves QC candidates identified by the automatic QC eligibility selection process, the QC Administrator shall be permitted to designate different evaluators than the evaluator(s) identified on the QC Notice.

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PROCESS: Initiate QC Evaluation (continued)

DESCRIPTION: (continued)

The updated QC data shall then be passed to the Management Subsystem, to accomplish the scheduling of the QC evaluation event.

DATA INPUT: QC Notice

DATA OUTPUT: QC Event Requirement Data

STRUCTURE: N/A

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20.4.1 Training Quality Control Component Data Flows.

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DATA FLOW: ATR Data for QC Evaluation Selection

DESCRIPTION: Specific data automatically examined and analyzed for each airman in an AFS, which determine whether the airman is a candidate for QC evaluation selection. The ATR data shall be used to identify potential QC evaluatee and evaluator candidates; and to invoke QC evaluation selection criteria which enable the random selection of QC evaluation candidates.

DATA SOURCE: External Entity 1.2

DATA DESTINATION: DFD 2.3, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Airman ID	The airman's full name, SSAN and rank.
Task History Certification Data	The Task ID, certification date, and the SSAN of the trainer, evaluator and certifying official for each task on which the airman is certified.
OPTR ID	The Operational Position Task Requirement (OPTR) to which the airman is assigned against. The OPTR ID shall include the seven digit numeric string which represents the airman's duty position number, and the three digit alpha/numeric string which represents the OPTR version (ie., STD represents standard OPTR, while a 3-digit numeral represents an individualized version).

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DATA FLOW: ATR Data for QC Evaluation Selection (continued)

STRUCTURE: (continued)

Data Items

Descriptions

PAS Code

The PAS code data for the airman, which identifies the base, MAJCOM and unit to which the airman is currently assigned. The PAS code is an alpha/numeric string of 8 characters.

FAC

The Functional Account Code which identifies the workcenter to which the airman is currently assigned. The FAC is an alpha/numeric string of 4 characters.

Training Schedule Data

The data reflected on the airman's training schedule, for each event listed. The data shall include:

- Event ID
- Airman's participation in event (as trainee/trainer/evaluator)
- Event start/stop dates and times
- Training type identification (Task ID, level of task, Objective ID and type of event).

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DATA FLOW: QC Candidate Selection Data

DESCRIPTION: Data which result from the automatic selection of Quality Control (QC) evaluation candidates for a specific QC evaluation. The data identify a task-evalautee-evaluator combination which meets QC evaluation selection criteria. The data shall be maintained with other task-evalautee-evaluator combinations for 30 days, to avoid re-selecting the QC candidates during the same thirty-day period.

DATA SOURCE: DFD 2.3, Process 1

DATA DESTINATION: DFD 2.3, Data Store E8

STRUCTURE:

<u>Data Item</u>	<u>Description</u>
QC Notice Date	The date (DDMMYYYY) that QC selection occurs. The QC selection date is automatically determined, and is used to date the QC Notice which is printed each time QC selection occurs.
AOTS Task ID	The alpha/numeric string of 6 characters that identifies the particular task selected as a QC task candidate.
QC Evaluatee ID	The rank, full name and SSAN of the individual selected as a QC evaluatee candidate.
QC Evaluator IDs	The rank, full name and SSAN of the individuals selected as QC evaluator candidates. A primary QC evaluator shall always be identified; an alternate QC evaluator is optional.

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DATA FLOW: QC Eligible Tasks

DESCRIPTION: Data applying to tasks which are eligible for Quality Control (QC) evaluation selection. These tasks are extracted from the pool of eligible QC tasks maintained by the Management Subsystem and used by the Training Quality Control Component when performing the automatic selection of QC evaluation candidates.

DATA SOURCE: External Entity 1.1

DATA DESTINATION: DFD 2.3, Process 1

STRUCTURE: For each task, data elements shall include:

<u>Data Item</u>	<u>Description</u>
AOTS Task ID	The alpha/numeric string of 6 characters that uniquely identifies the particular task.
AFSC	The alpha/numeric string of 7 characters that identifies the particular Air Force Speciality Code for which the task applies.
PAS Code(s)	The PAS code data which identifies the base(s), MAJCOM(s) and unit(s) where the task is performed. Each PAS code is an alpha/numeric string of 8 characters.
FAC(s)	The Functional Account Codes which identify the workcenter(s) where the task is performed. Each FAC is an alpha/numeric string of 6 characters.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: QC Event Requirement Data

DESCRIPTION: Data which are updated by a QC Administrator to initiate a Quality Control (QC) event. These data are passed to the Management Subsystem, to be used for scheduling the QC evaluation event.

DATA SOURCE: DFD 2.3, Process 2

DATA DESTINATION: External Entity 1.3

STRUCTURE: Data elements will include:

<u>Data Item</u>	<u>Description</u>
AOTS Task ID	An alpha/numeric string of 6 characters which uniquely identifies the particular task for which the QC evaluation event applies.
QC Event Times	The start/stop dates and times when the evaluation event is to occur. Dates shall be in the DDMMYYYY format, while times shall be in the military time format (0830, 1400, 2300, etc.).
Evaluatee ID	The SSAN of the individual to be evaluated.
Evaluator ID(s)	The SSAN(s) of the individual(s) who will conduct the QC evaluation. A primary evaluator shall always be identified; an alternate evaluator shall be optional.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: QC Log Data

DESCRIPTION: Data which are examined each time the automatic QC candidate selection process is accomplished. The data are used to preclude re-selection of QC candidate tasks, evaluatees and evaluators within a thirty-day period.

DATA SOURCE: DFD 2.3, Data Store E8

DATA DESTINATION: DFD 2.3, Process 1

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Same data items/descriptions as for Data Store E8, QC Log.	Refer to Data Store E8 for further details.

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DATA FLOW: QC Notice

DESCRIPTION: A printed notice which shall be automatically generated each time the Quality Control (QC) evaluation selection process is accomplished and QC task-evaluated-evaluator candidates have been identified for a specific QC evaluation. The notice shall be sent to the appropriate QC Administrator. The notice data may be used by the administrator to initiate a QC evaluation.

DATA SOURCE: DFD 2.3, Process 1

DATA DESTINATION: DFD 2.3, External Entity 5 and Process 2

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
QC Notice Date	The date (DDMMYYYY) that QC selection occurs. The QC selection date is automatically determined, and is used to date the QC Notice when the notice is printed.
QC Administrator ID	The rank, full name, SSAN and unit/workcenter of the QC Administrator.
QC Evaluatee ID	The rank, full name, and SSAN of the individual selected as a QC evaluatee candidate.
AOTS Task ID	The alpha/numeric string of 6 characters that identifies the particular task selected as a QC task candidate.

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DATA FLOW: QC Notice (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Task Statement	The statement which identifies the behavior and performance requirements of the task.
Task Certification Date	The date (DDMMYYYY) the QC evaluatee candidate was certified on the QC task.
QC Evaluator IDs	The rank, full name and SSAN of the individual(s) selected as a QC evaluator candidate. A primary QC evaluator shall always be identified; an alternate QC evaluator shall be optional.
QC Notice Purpose	The printed information contained in the notice which identifies the purpose of the notice and the actions required by the recipient (QC Administrator).

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

20.4.2 Training Quality Control Component Data Stores.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA STORE: E8, QC Log

DESCRIPTION: A continuously updated log of data which shall be maintained for Quality Control (QC) evaluation selection purposes. The log shall be an accumulation of the task-evalutee-evaluator candidates which result from the QC selection process (accomplished automatically every seven days). Data for selected QC candidates shall be maintained on this log for a period of thirty days.

DATA SOURCE: DFD 2.3, Process 1

STRUCTURE: Data Elements shall include:

<u>Data Item</u>	<u>Description</u>
QC Notice Dates	The dates on which respective tasks, evaluatees and evaluators are matched and selected as QC evaluation candidates. For each task-evalutee-evaluator combination of QC candidates, the selection date is automatically determined and used as the date for the corresponding QC Notice. Dates shall be identified in the DDMMYY format.
AOTS Task IDs	The identification of tasks selected as QC task candidates. Each ID is an alpha/numeric string of 6 characters that uniquely identifies a particular task.
Evaluatee IDs	The identification of individuals selected as QC evaluatee candidates. The rank, full name and SSAN of each evaluatee candidate shall be identified.
Evaluator IDs	The identification of individuals selected as QC evaluator candidates. The rank, full name and SSAN of each evaluator candidate shall be identified.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

20.5 System Evaluation Component Processes.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.4, Evaluate System

LEVEL OF AUTOMATION: Automated, automatic

DESCRIPTION: This process shall enable workcenter-level managers, unit-level training managers, base-level training managers, unit commanders and other authorized personnel to obtain a variety of reports which can be used to monitor training program effectiveness, training progress and training quality.

This process shall provide capabilities to consolidate, sort, analyze, and summarize data used to generate standard training reports as well as ad hoc training reports. This process shall also enable authorized personnel to request specific reports suitable for evaluating individuals, work centers, units and bases operating under the AOTS.

DATA INPUT: ATR Data for Reports
Events Data for Reports
Training Report Requests

DATA OUTPUT: Standard/Ad Hoc Training Reports

STRUCTURE: This process includes the following subprocesses:

- Process 2.4.1, Consolidate/Sort Reports Data
- Process 2.4.2, Calculate Data and Generate Reports
- Process 2.4.3, Request Specific Report

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.4.1, Consolidate/Sort Reports Data

LEVEL OF AUTOMATION: Automatic

DESCRIPTION: This process shall enable the system to automatically extract, consolidate and sort data for reports which shall be used to evaluate the effectiveness of the AOTS.

Data shall be extracted from each person's ATR (including personnel data, training history data, ITR data, position qualification status data, etc.). Data shall also be extracted from files which maintain data for training and evaluation events. The extracted data shall be consolidated/sorted in a way to enable numerous types of training reports to be efficiently generated.

To provide current data for each report, this process shall be accomplished each day/night. Personnel data shall be maintained on a current basis, while other report data shall be continually aggregated to support monthly reporting periods. Data shall be sorted and maintained to support both standard training reports and ad hoc training reports.

DATA INPUT: ATR Data for Reports
Events Data for Reports

DATA OUTPUT: Sorted Data for Training Reports

STRUCTURE: N/A

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

PROCESS: 2.4.2, Calculate Data and Generate Reports

LEVEL OF AUTOMATION: Automatic

DESCRIPTION: This process shall enable the system to automatically calculate data and generate reports which shall identify and summarize training effectiveness, training progress and training performance under the AOTS.

Standard reports shall be calculated and generated daily/nightly, to provide current and aggregated data for evaluation. Ad hoc reports shall be calculated and generated on an "as requested" basis. Appropriate reports data shall be extracted, and algorithms shall be invoked, to generate each report.

This process shall enable the automatic on-line storage of reports. Reports shall be maintained on a current and historical basis.

DATA INPUT: Standard Reports Data
Ad Hoc Reports Data
Ad Hoc Report Request Data

DATA OUTPUT: Standard Reports
Ad Hoc Report

STRUCTURE: N/A

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PROCESS: 2.4.3, Request Specific Report

LEVEL OF AUTOMATION: Automated

DESCRIPTION: This process shall enable an authorized person to request a specific training report. Each requested report may be reviewed on line or printed for off-line review.

This process shall enable:

1. A given supervisor to request a training report for an individual whom he/she supervises.
2. A given Unit Training Manager to request a training report for an individual, workcenter or the unit for which he/she is responsible.
3. A System Administrator to request a training report for an individual, workcenter, unit or base (when such a request is received from authorized operational unit personnel, e.g., Unit Commander, Base OJT).

This process shall enable a report requestor to enter/select specific data (ie., report name, printer ID and print interval) to obtain a desired report. When a report is to be reviewed on line, the printer ID and print interval will not apply.

This process shall support the printing of a report in two ways:

1. Automatic print upon request,
2. Automatic print upon specified time interval (daily, weekly, monthly).

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PROCESS: Request Specific Report (continued)

DESCRIPTION: (continued)

The following reports, for an individual, shall be made available for request from an authorized supervisor:

1. Position Qualification Status
2. Upgrade Training Status
3. CDC status
4. Evaluator Performance Status
5. Trainer Performance Status
6. Recurring Training Requirements
7. Notification of Impact of Personnel Loss
8. Ad hoc reports.

The following reports shall be made available for request from a Unit Training Manager:

1. Same individual's reports as authorized for a supervisor (1-7 above)
2. Workcenter/unit's Position Qualification Status Summary
3. Workcenter/unit's Upgrade Training Status Summary
4. Workcenter/unit's Upgrade Training Roster
5. Workcenter/unit's Training Event Status Summary
6. Workcenter's Task Coverage Summary
7. Unit's Evaluator Performance Summary
8. Workcenter/unit's Recurring Training Requirements
9. Ad hoc reports.

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PROCESS: Request Specific Report (continued)

DESCRIPTION: (continued)

The following reports shall be made available for request from a System Administrator:

1. Any individual's report,
2. Any workcenter/unit's report,
3. Base-level reports, which are aggregations of workcenter/unit reports data,
4. Ad hoc reports.

DATA INPUT: Training Report Request
Standard/Ad Hoc Training Report

DATA OUTPUT: Ad Hoc Report Request Data
Standard Report Request Data

STRUCTURE: N/A

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

20.5.1 System Evaluation Component Data Flows.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Ad Hoc Report

DESCRIPTION: A specific report which contains requested data which has been calculated/analyzed for the purpose of evaluating one or more aspects of the AOTS system. The report contains data which are found on one or more standard training reports, however, the data have been uniquely combined and calculated or presented differently than data which are provided by a standard report.

DATA SOURCE: DFD 2.4, Process 2

DATA DESTINATION: DFD 2.4, Data Store E10

STRUCTURE: The structure shall fluctuate, depending on the data required by the specific ad hoc report. Each ad hoc report is unique, therefore, no further structure can be defined.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Ad Hoc Report Request Data

DESCRIPTION: An automated request for a specific ad hoc report. This request shall be updated by a Systems Administrator and shall contain the data specified by the administrator. The updated request shall be calculated by the system during the daily/nightly reports generation process, and the respective ad hoc report shall be generated.

DATA SOURCE: DFD 2.4, Process 3

DATA DESTINATION: DFD 2.4, Process 2

STRUCTURE: The structure shall fluctuate, depending on the data required by the specific ad hoc report. Each ad hoc report is unique, therefore, no further structure can be defined.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Ad Hoc Reports Data

DESCRIPTION: Data used to calculate and generate an ad hoc training report. These data are extracted from the data being maintained for all reports.

DATA SOURCE: DFD 2.4, Data Store E9

DATA DESTINATION: DFD 2.4, Process 2

STRUCTURE: The structure shall fluctuate, depending on the data required by the specific ad hoc report. Each ad hoc report is unique, therefore, no further structure can be defined.

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DATA FLOW: ATR Data for Reports

DESCRIPTION: Data automatically extracted, on a daily/nightly basis, from each person's Airman Training Record (ATR) which shall be consolidated, sorted and analyzed for the purpose of providing a variety of standard and ad hoc training reports.

DATA SOURCE: DFD 2.4, External Entity 1.2

DATA DESTINATION: DFD 2.4, Process 1

STRUCTURE: The structure of this data flow shall enable the collection of all ATR data for each person operating under the AOTS. Data elements shall be applicable for each person and include:

<u>Data Item</u>	<u>Description</u>
Personnel Data for Reports	Data extracted from an ATR which identifies the name and other personnel information pertaining to the individual. Such data will include: full name, rank, SSAN, PAFSC, DAFSC, CAFSC, 2AFSC, 3AFSC, 4AFSC, position number, duty title, unit, base, PAS code, FAC and AF component.
Training History Data for Reports	Data extracted from an ATR which identifies the tasks and other training requirements for which the individual is qualified. General history data are also extracted. Such data will include: <ul style="list-style-type: none">- General history data: Training Status Code, date entered/completed/withdrawn training and date initially entered re-training

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DATA FLOW: ATR Data for Reports (continued)

STRUCTURE: (continued)

Data Items Descriptions
Training History Data for Reports (continued)

- Task history data (for each task):
Task ID, Task Version, date individual was certified, task statement, trainer's SSAN/rank/full name, evaluator's SSAN/rank/full name, certifying official's SSAN/rank/full name, and installation where individual was certified on task
- Other training history data (for each ancillary course, additional duty course, contingency task, ECI/CDC course, PME course, and formal training course): Course ID (or task ID or course title, as appropriate), date individual completed the training, and installation where individual completed the training

Position
Qualification
Data for Reports

Data extracted from an individual's ATR which identifies the status of each task required by the Operational Position Task Requirements (OPTR) against which the individual is assigned. Data for each task includes: Task ID, Task Version number, date certified (if applicable), date recertification is due (if applicable), current status of task (none, in progress, certified, etc.), and task statement.

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DATA FLOW: ATR Data for Reports (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Individual Training Requirements Data for Reports	<p>Data extracted from an individual's ATR which identifies the training requirements pertaining to the individual. General ITR data, task training requirements and other training requirements shall be extracted, and include:</p> <ul style="list-style-type: none">- General ITR data: OPTR ID, primary trainer's SSAN/rank/full name, and primary evaluator's SSAN/rank/full name- Task requirements data (for each task): Task ID, task statement and current status of the task (none, in progress, awaiting certification, etc.)- Other training requirements data (for each ancillary course, additional duty course, contingency task, ECI/CDC course, PME course and formal training course): Course ID (or course title or Task ID, as appropriate) and current status of the requirement (none or in progress)

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DATA FLOW: Events Data for Reports

DESCRIPTION: Data which identifies training and evaluation events which have occurred, are in progress or have been completed during a specified timeframe. Such data shall be consolidated, sorted and analyzed, on a daily/nightly basis, for the purpose of providing a variety of standard and ad hoc training reports. Events data shall also be aggregated to support monthly reporting periods.

DATA SOURCE: DFD 2.4, External Entity 1.3

DATA DESTINATION: DFD 2.4, Process 1

STRUCTURE: The structure of this data flow shall enable the collection of all data for each event. Data elements are applicable for each event and include:

<u>Data Item</u>	<u>Description</u>
Event ID	A numeric string, up to four digits, identifying a particular training/evaluation event.
Event Status	The initial/current status for the event (i.e., scheduled, assigned, reschedule, reassigned, none, and complete) within the reporting period.
Event Times	Start dates/times for the initial and current status for the event.
Training Type	Type of training (ie., AFS task training, ancillary, additional duty, or contingency task)
Event Type	Type of event (ie., knowledge training or performance training). This information only applies to AFS task training events.

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DATA FLOW: Events Data for Reports (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Description</u>
Course/Task ID	The Course ID or Task ID which identifies the particular course or task which applies to the event.
Task Level	Data identifying the task breakdown level for which the event applies (i.e., task-level or subtask-level). This information only applies to AFS task training events.
Trainee's ID	SSAN of each trainee for which the event applies.
Trainer's or Evaluator's ID	SSAN of the designated trainer or evaluator for the event.
Overall Results	Data identifying whether or not an event was passed or failed. This information only applies to AFS task training events which have been completed. For evaluation events, the data shall also include the test score for each trainee, when such data are available.
Cancellation Reason	Data identifying the reason for cancelling an event.

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DATA FLOW: Sorted Data for Training Reports

DESCRIPTION: Data which has been consolidated and sorted for the purpose of statistical analysis and generation of training reports. These data shall be automatically sorted on a daily/nightly basis and shall be added to other reports data previously consolidated/sorted for a given reporting period.

DATA SOURCE: DFD 2.4, Process 1

DATA DESTINATION: DFD 2.4, Data Store E9

STRUCTURE: The structure of this data flow shall enable the sorted data to be aligned with other data which is maintained for the purpose of training reports. The data is an aggration of data from two other data flows: ATR Data for Reports and Events Data for Reports.

<u>Data Items</u>	<u>Description</u>
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Same items/descriptions as for ATR Data for Reports and Events Data for Reports. Refer to these data flows for further details.

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DATA FLOW: Standard Report Request Data

DESCRIPTION: An automated request to access a specific standard training report. This request may be submitted at any time, by any authorized person. The request includes the selection of the specific report and other data which identifies how the report is to be reviewed (display on line, or print off line).

DATA SOURCE: DFD 2.4, Process 3

DATA DESTINATION: DFD 2.4, Data Store E10

STRUCTURE: Data elements shall include:

<u>Data Item</u>	<u>Description</u>
Title of Standard Report	The name identifying the specific training report desired. Titles for standard reports shall include: Position Qualification Status and Summary; Workcenter Task Coverage; Notification of Impact of Personnel Loss; Upgrade Training Status, Roster and Summary; Evaluator Performance Status and Summary; Training Event Status Summary; Trainer Performance; Recurring Training Requirements and Summary; and CDC Status. This data item shall be specified by an individual's selection from a menu or prompt.

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DATA FLOW: Standard Report Request Data (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
Reporting Level Data	<p>The organizational level/identification for which the report applies. There shall be four reporting levels: Individual, Workcenter, Unit and Base. This data item shall be specified by an individual's selectin from a menu or prompt.</p> <ul style="list-style-type: none">- For an Individual Standard Report, the SSAN of the individual shall be also specified- For a Workcenter Standard Report, the PAS Code and FAC for the workcenter shall be also specified- For a Unit or Base Standard Report, the PAS shall be also specified
Report Print Interval	<p>The report shall be automatically printed based on the interval chosen by the requestor. The interval shall be one of the following: upon request, daily, weekly or monthly.</p>
Print Location	<p>The Printer ID where the report is to be printed. The Printer ID is an alpha/numeric item, not to exceed seven characters.</p>

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Date: 31 October 1989

DATA FLOW: Standard Reports

DESCRIPTION: The various AOTS standard training reports which are generated on a daily/nightly basis.

DATA SOURCE: DFD 2.4, Process 2

DATA DESTINATION: DFD 2.4, Data Store E10

STRUCTURE: The structure of this data flow shall support each standard training report which is generated. For personnel/organizations operating under the AOTS, there shall be (at a minimum): seven standard reports which apply to each individual; six standard reports which apply to each workcenter; six standard reports which apply to each unit; and six standard reports which apply to each base.

<u>Data Items</u>	<u>Description</u>
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Same data items/descriptions as for Data Store E10, Training Reports. For further details, refer to the data items which apply to each standard report described within Data Store E10.	
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Specification Number 70S647300B
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Date: 31 October 1989

DATA FLOW: Standard Reports Data

DESCRIPTION: Data used when calculating and generating various AOTS standard training reports. These data are extracted from the data being maintained for all reports.

DATA SOURCE: DFD 2.4, Data Store E9

DATA DESTINATION: DFD 2.4, Process 2

STRUCTUE: The structure of this data flow shall provide the appropriate data used to generate each standard training report. For personnel/organizations operating under the AOTS, there shall be (at a minimum): seven standard reports which apply to each individual; six standard reports which apply to each workcenter; six standard reports which apply to each unit; and six standard reports which apply to each base.

Data Items

Description

Same data items/descriptions as for ATR Data for Reports and Events Data for Reports. Refer to these data flows for further details.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA FLOW: Standard/Ad Hoc Training Report

DESCRIPTION: The specific standard training report or ad hoc training report which was requested by an authorized person. The report may be reviewed on line by the report requestor, or may be printed at a specified printer.

DATA SOURCE: DFD 2.4, Data Store E10

DATA DESTINATION: DFD 2.4, Process 3 and External Entity 5

STRUCTURE: The structure of this data flow shall support any requested standard report, as well as any requested ad hoc report. Data elements will include:

<u>Data Items</u>	<u>Description</u>
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For a specific standard training report, refer to the data items and descriptions provided for Data Store E10, Training Reports. The contents of each report has been described within Data Store E10.

For an ad hoc report, the data items/descriptions are unique. No further details can be provided since each report's contents shall be specific.

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DATA FLOW: Training Report Request

DESCRIPTION: A verbal or written request for a specific training report. The request is received from an authorized person within an operational unit, such as Base OJT or unit commander. The request is received by the Systems Administrator, who then updates the request for the report into the system.

DATA SOURCE: External Entity 5

DATA DESTINATION: DFD 2.4, Process 3

STRUCTURE: The structure shall support a request for a standard report or an ad hoc report. Data elements will include:

DATA ITEMS

DESCRIPTIONS

For a standard training report:

- | | |
|----------------------------|---|
| - Title of Standard Report | The name identifying the specific training report desired. |
| - Reporting Level Data | The organizational level/identification for which the report applies. There shall be four reporting levels: Individual, Workcenter, Unit and Base. <ul style="list-style-type: none">- For an individual standard report, the name or SSAN of the individual must be provided- For a workcenter, unit or base standard report: the name of the organization must be provided; or the PAS Code (for workcenter, unit and/or base) and the FAC (for workcenter) must be provided |

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DATA FLOW: Training Report Request (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
- Report Print Interval	The report can be printed on a one-time basis (upon request) or a repeated basis (daily, weekly or monthly).
- Print Location	The Printer ID where the report is to be printed. A workcenter's printer ID may be specified, or the report shall be printed directly to the Systems Administrator (who shall then forward the report to the requesting individual).

For an ad hoc training report:

The data items/descriptions shall be unique for each ad hoc report request, therefore, no further details can be provided.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

20.5.2 System Evaluation Component Data Stores.

Specification Number 70S647300B
Code Ident. No. 76301
Date: 31 October 1989

DATA STORE: E9, Consolidated Training Reports Data

DESCRIPTION: Data maintained for the purpose of generating training reports to evaluate the AOTS. These data have been consolidated and sorted, to enable extraction and statistical analysis to occur as required for each training report. Data shall be maintained on a current basis, and shall support monthly reporting periods.

DATA SOURCE: DFD 2.4, Process 1

STRUCTURE: The structure of data store shall be one or more files which contain tables for sorting and listing the various data elements required for all reports.

<u>Data Items</u>	<u>Description</u>
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Same items/descriptions as for ATR Data for Reports and Events Data for Reports.	Refer to these data flows for further details.
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DATA STORE: E10, Training Reports

DESCRIPTION: A file which contains current and historical training reports which have been generated for the purpose of evaluating training performance, progress, quality and effectiveness for each person, workcenter, unit and base operating under the AOTS.

DATA SOURCE: DFD 2.4, Process 2

STRUCTURE: The structure of this file shall enable different types of reports (both standard and ad hoc) to be maintained. Data elements shall be specific for each report and shall include:

<u>Data Item</u>	<u>Description</u>
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FOR INDIVIDUAL POSITION QUALIFICATION STATUS REPORT:

Report Title	Name of report.
Report Date	Date (DDMMYYYY) that report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Personnel Data for Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, OPTR ID and OPTR/Duty Title.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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INDIVIDUAL POSITION QUALIFICATION STATUS REPORT (continued):

Position Qualification Status Data for Report	Data extracted from the individual's ATR, and calculated, which identifies the individual's status and progress towards position qualification. Such data will include:
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- tasks required for position qualification
(number required; number qualified;
percent qualified)
- time in training for position
qualification (actual time of individual;
cumulative average for all trainees)
- testing/evaluations accomplished for
position qualification (knowledge tests
completed, passed and percentage passed;
performance evaluations completed, passed
and percentage passed; QC evaluations
completed, passed, percentage passed,
failed resulting in task decertification
and percentage decertified)

FOR INDIVIDUAL UPGRADE TRAINING STATUS REPORT:

Report Title	Name of report.
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Report Date	The date (DDMMYYYY) the report was generated.
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Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, DAFSC, PAFSC, 2AFSC, TSC, OPTR ID, OPTR/Duty Title, date entered/completed/withdrawn training and date initially entered retraining.
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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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INDIVIDUAL UPGRADE TRAINING STATUS REPORT (continued)

PME Data for Report	Data extracted from the individual's ATR which identifies the PME courses the individual has completed or is required to complete. For each PME course, the course title and completion date (if applicable) are reported.
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Position Qualification Task Data for Report	Data extracted from the individual's ATR, and calculated, which identifies the individual's upgrade training status in regards to task training. This data will include:
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- Number of tasks required for position qualification,
- Number of tasks for which training has been completed for individual, and
- Percentage of tasks completed.

FOR INDIVIDUAL CDC STATUS REPORT:

Report Title	Name of report.
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Report Date	The date (DDMMYY) the report was generated.
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Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, DAFSC, PAFSC, 2AFSC, TSC, OPTR ID, OPTR/Duty Title, and date entered/completed/withdrawn training.
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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
INDIVIDUAL CDC STATUS REPORT (continued)	

CDC Status Data For Report	Data extracted from the individual's ITR which identifies the individual's current CDC status and estimated/actual CDC completion. Such data will include: Course number, date course was requested, date course was received, date individual was enrolled in course, date of estimated completion, volume review exercise data (volume, date started, estimated/actual completion date and score), and course examination data (test date and test score).
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FOR INDIVIDUAL EVALUATOR PERFORMANCE REPORT:

Report Title	Name of report.
Report Date	Date (DDMMYYYY) that report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, OPTR ID and OPTR/Duty Title.

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DATA STORE: Training Reports (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
INDIVIDUAL EVALUATOR PERFORMANCE REPORT (continued)	

Evaluator
Performance
Data for Report

Data extracted from the individual's ATR (training history) and from other database files, which identifies the individual's ability to evaluate trainees' performance of tasks. The extracted data shall also be calculated to generate the report and will include:

- number of tasks the individual is qualified to evaluate (individual is qualified to evaluate any task for which he/she is certified),
- number of performance evaluations the individual has conducted,
- number of performance evaluations which the individual conducted and which were failed by the evaluatee(s), and
- percentage of evaluations that were failed.

FOR INDIVIDUAL TRAINER PERFORMANCE REPORT:

Report Title	Name of report.
Report Date	Date (DDMMYY), that report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

Data Items Descriptions
INDIVIDUAL TRAINER PERFORMANCE REPORT (continued)

Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, OPTR ID and OPTR/Duty Title.
Trainer Performance Data for Report	<p>Data extracted from the individual's ATR and from other database files, and then calculated, which identifies the individual's ability to train AFS tasks. Such data will include:</p> <ul style="list-style-type: none">- number of tasks the individual has trained within the reporting period- number of trainees the individual has trained during the reporting period- data for each task the individual has trained<ul style="list-style-type: none">-- Number of knowledge tests administered, number failed and percentage failed-- Number of performance tests administered, number failed and percentage failed-- Number of Quality Control (QC) evaluations administered, number failed and percentage failed- Number of tasks in which training resulted in task qualification

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

Data Items Descriptions
FOR INDIVIDUAL RECURRING TRAINING REQUIREMENTS REPORT:

Report Title	Name of report.
Report Date	Date (DDMMYYYY) that report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, OPTR ID and OPTR/Duty.Title.
Recurring Training Requirements for Report	Data extracted from the person's ITR identifying the recurring tasks and Other Training Requirements (OTRs) which the individual must accomplish. Each task is identified by its Task ID and each OTR is identified by its Course ID, course name or Task ID (contingency tasks). The status of each requirement (none, scheduled, in progress, awaiting refresher training, etc) will also be identified.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
FOR INDIVIDUAL NOTIFICATION OF IMPACT OF PERSONNEL LOSS REPORT:	
Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Personnel Data For Report	Data extracted from the personnel data being maintained in an individual's ATR. Such data will include: Component, rank, name, SSAN, base, unit, workcenter, CAFSC, OPTR ID and OPTR/Duty Title.
Impact of Loss Data for Report	<p>Data extracted from the individual's ATR which identifies the tasks for which the individual is qualified (certified). Other data are also extracted from each person's ATR within the workcenter, and calculated, to generate the report. Data reported will include:</p> <ul style="list-style-type: none">- Number of persons assigned within the workcenter who are operating under the AOTS- List of tasks which the losing individual is qualified to perform. For each task listed, the following data will be reported:<ul style="list-style-type: none">-- Task ID-- Task Statement-- Number of workcenter personnel who are qualified on the task-- Percent of workcenter personnel who are qualified on the task

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

Data Items Descriptions
FOR WORKCENTER POSITION QUALIFICATION STATUS SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Workcenter Data for Report	The data identifying the workcenter for which the report is generated. Such data will include: Component, base, unit, workcenter and AFS.
Workcenter Posn Qualification Status Data for Report	Data which are aggregated from various ATRs of persons assigned to the workcenter, and then calculated, to generate this report. Such data will include: <ul style="list-style-type: none">- Number of personnel assigned, number of personnel who are position qualified and percent of persons who are position qualified- Time in training for position qualification<ul style="list-style-type: none">-- cumulative average for all trainees-- number/percent qualifying in less than average time during reporting period, and number/percent qualifying in greater than average time during reporting period

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
WORKCENTER POSITION	QUALIFICATION STATUS SUMMARY REPORT (con't)

- Task knowledge testing data for the reporting period (number of knowledge tests administered, number passed and percentage passed)
- Task performance evaluations data for the reporting period (number of evaluations administered, number passed and percentage passed)
- Quality Control (QC) evaluations data for the reporting period (number of QC evaluations administered, number passed, percentage passed, number failed resulting in task decertification and percentage decertified)

FOR WORKCENTER UPGRADE TRAINING STATUS SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Workcenter Data for Report	The data identifying the workcenter for which the report is generated. Such data will include: Component, base, unit, workcenter and AFS.

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DATA STORE: Training Reports (continued)

STRUCTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
WORKCENTER UPGRADE TRAINING STATUS SUMMARY REPORT (continued)	

Upgrade Training Data for Report	Data which are aggregated from various ATRs of persons assigned to the workcenter, and then calculated, to generate this report. Such data will include:
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- Number of personnel assigned: in
upgrade training, in 3 level training,
in 5 level training, in 7 level training,
in 3 level retraining, in 5 level
retraining, in 7 level retraining; and
percentage of assigned personnel in
upgrade training
- CDC enrollment data: number of persons
enrolled in CDCs, number of persons
completing CDCs within reporting period,
number of persons failing CDC course
examinations within reporting period and
percentage of persons completing CDCs
during the reporting period.
- Upgrade training removal data: number
of persons removed temporarily, number
removed permanently and percentage of
persons removed from upgrade training
- OJT progress evaluations data: number
of persons due for supervisor evaluation
within the next 60 days, number of
persons due for commander evaluation
within the next 60 days and number due
final evaluations within the next 60 days

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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FOR WORKCENTER TASK COVERAGE SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Workcenter Data for Report	The data identifying the workcenter for which the report is generated. Such data will include: Component, base, unit, workcenter and AFS.
Workcenter Task Coverage Data for Report	Data which are aggregated from various ATRs of persons assigned to the workcenter and from OPTRs to which the persons are assigned. Report data has been calculated to generate the report, and will include: <ul style="list-style-type: none">- Number of persons currently assigned to the workcenter- A listing of the tasks contained on OPTRs which apply to the workcenter being reported. Data for each task listed includes:<ul style="list-style-type: none">-- AFS-- Task ID-- number of persons who are required to perform the task-- number of persons who are qualified (certified) on the task-- percent of persons who are qualified (certified) on the task

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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FOR WORKCENTER UPGRADE TRAINING ROSTER:

This roster is a printout of the Individual Upgrade Training Status Report for each person assigned to the respective workcenter. Refer to data items/descriptions provided for INDIVIDUAL UPGRADE STATUS REPORT included within this datastore.

FOR WORKCENTER TRAINING EVENT STATUS SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Workcenter Data for Report	The data identifying the workcenter for which the report is generated. Such data will include: Component, base, unit and workcenter.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
WORKCENTER TRAINING	EVENT STATUS SUMMARY REPORT (continued)

Training Event
Status Data for
Report

The data extracted from each persons' ATR for persons assigned to the workcenter being reported. The data shall be aggregated and calculated to provide this report, and shall include:

- Data identifying task knowledge training events accomplished during the reporting period (number scheduled, number completed, and percent of events scheduled which were completed)
- Data identifying task knowledge evaluation events accomplished during the reporting period (number scheduled, number completed, and percent of events scheduled which were completed)
- Data identifying task performance training events accomplished during the reporting period (number scheduled, number completed, and percent of events scheduled which were completed)
- Data identifying task performance evaluation events accomplished during the reporting period (number scheduled, number completed, and percent of events scheduled which were completed)
- Data identifying ancillary, additional duty and contingency task training events accomplished during the reporting period (number scheduled, number completed and percent of events scheduled which were completed)

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
WORKCENTER TRAINING EVENT STATUS SUMMARY REPORT (continued)	

- Data identifying the Quality Control (QC) events accomplished during the reporting period (number scheduled, number completed, and percent of events scheduled which were completed).
- Data identifying the aggregation of all types of events accomplished during the reporting period (total events scheduled, total events completed, and percent of total events scheduled which were completed).

FOR WORKCENTER RECURRING TRAINING REQUIREMENTS SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Workcenter Data for Report	The data identifying the workcenter for which the report is generated. Such data will include: Component, base, unit and workcenter.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
WORKCENTER RECURRING TRAINING REQUIREMENTS SUMMARY REPORT (con't)	

List of Training
Requirements for
for Report

Data extracted from the ITRs of individuals assigned to duty within the workcenter for which the report applies. For each individual requiring task or other training (ancillary, additional duty, etc), the following data is listed:

- full name
- SSAN
- AFS
- each training requirement (identified by Task ID, course ID or course name)
- the current status (none, in progress, awaiting refresher training, etc) of each requirement

FOR UNIT POSITION QUALIFICATION STATUS SUMMARY REPORT:

Same data items as for the Workcenter Position Qualfication Status Summary Report. Each applicable workcenter's data are further aggregated to generate the report for a given unit.

FOR UNIT UPGRADE TRAINING STATUS SUMMARY REPORT:

Same data items as for the Workcenter Upgrade Training Status Summary Report. Each applicable workcenter's data are further aggregated to generate the report for a given unit.

FOR UNIT UPGRADE TRAINING ROSTER:

Same data items as for the Workcenter Upgrade Training Roster. Each applicable workcenter's data are further aggregated to generate the report for a given unit.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

Data Items Descriptions
FOR UNIT EVALUATOR PERFORMANCE SUMMARY REPORT:

Report Title	Name of report.
Report Date	The date (DDMMYYYY) report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Unit Data for Report	The data identifying the unit for which the report is generated. Such data will include: Component, base, unit, workcenter and AFS.
Unit Evaluator Performance Data for Report	<p>Data which are extracted from each individual's ATR within the unit, and which have been aggregated and calculated for the purpose of this report. Such data will include:</p> <ul style="list-style-type: none">- Number of persons qualified as evaluators (ie., certified on one or more tasks)- Number of tasks qualified to evaluate (ie., at least one person is certified)- Number of task evaluations during the reporting period (cumulative number of performance evaluations, cumulative number of performance evaluations failed, and percentage of performance evaluations failed)- List of tasks without qualified evaluators within unit. For each task: the AFS, Task ID and task statement shall be identified on the list.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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FOR UNIT TRAINING EVENT STATUS SUMMARY REPORT:

Same data items as for the Workcenter Training Event Status Summary Report. Each applicable workcenter's data are further aggregated to generate the report for a given unit.

FOR UNIT RECURRING TRAINING REQUIREMENTS SUMMARY REPORT:

Same data items as for the Workcenter Recurring Training Requirements Summary Report. Each applicable workcenter's data are further aggregated to generate the report for a given unit.

FOR BASE POSITION QUALIFICATION STATUS SUMMARY REPORT:

Same data items as for the Workcenter/Unit Position Qualfication Status Summary Report. Each applicable unit's data are further aggregated to generate the report for a given base.

FOR BASE UPGRADE TRAINING STATUS SUMMARY REPORT:

Same data items as for the Workcenter/Unit Upgrade Training Status Summary Report. Each applicable unit's data are further aggregated to generate the report for a given base.

FOR BASE EVALUATOR PERFORMANCE SUMMARY REPORT:

Same data items as for the Unit Evaluator Performance Summary Report. Each applicable unit's data are further aggregated to generate the report for a given base.

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DATA STORE: Training Reports (continued)

STRUCUTURE: (continued)

<u>Data Items</u>	<u>Descriptions</u>
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FOR BASE UPGRADE TRAINING ROSTER:

Same data items as for the Unit Upgrade Training Roster. Each applicable unit's data are further aggregated to generate the report for a given base.

FOR BASE TRAINING EVENT STATUS SUMMARY REPORT:

Same data items as for the Workcenter/Unit Training Event Status Summary Report. Each applicable unit's data are further aggregated to generate the report for a given base..

FOR BASE RECURRING TRAINING REQUIREMENTS SUMMARY REPORT:

Same data items as for the Workcenter/Unit Recurring Training Requirements Summary Report. Each applicable unit's data are further aggregated to generate the report for a given base.

FOR AD HOC REPORT:

Report Date	The date (DDMMYYYY) report was generated.
Reporting Period	The inclusive dates which the report covers. This reporting period will be the first day of the preceding month through the last day of the preceding month.
Ad Hoc Report Data	The data extracted, sorted, calculated and produced for a given <u>ad hoc</u> report. Each <u>ad hoc</u> report serves a particular purpose, and identifies or summarizes specific data, as defined by the requestor.