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SOURCES OF INFORMATION ON
INTEGRATED PERSONNEL AND TRAINING SUPPORT PLANNING:
A HANDBOOK FOR TRADOC SYSTEM MANAGERS (TSM)

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

The purpose of this handbook is to provide guidance to TRADOC System Managers (TSM) and training developers on the training information acquisition and input requirements of the Life Cycle Systems Management Model (LCSMM). The development of a training subsystem for new materiel should be accomplished in accordance with the Army's Integrated Personnel System (IPS) model. TRADOC Regulation 600-4 describes TRADOC System Managers' responsibilities for the IPS management of selected systems within TRADOC to ensure that personnel and training requirements are developed and fully integrated early and continuously

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throughout the developmental cycle for new materiel systems. That regulation
contains brief descriptions of each of the key IPS actions and events which
must be accomplished during each phase of the Life Cycle System Management
Model for new materiel. This handbook identifies the major sources of input
data and information required to accomplish key IPS actions and events, how
to access that data/information, and the general procedures for accomplishing
key IPS events. It also describes the relationship between the IPS management
model and the Life Cycle System Management Model.

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SECTION I

INTRODUCTION

A. PURPOSE

The purpose of this handbook is to provide guidance to TRADOC System Managers (TSM) and training developers on the training information acquisition and input requirements of the Life Cycle Systems Management Model (LCSMM). The development of a training subsystem for new materiel should be accomplished in accordance with the Army's Integrated Personnel System (IPS) model. TRADOC Regulation 600-4 describes TRADOC System Managers' responsibilities for the IPS management of selected systems within TRADOC to ensure that personnel and training requirements are developed and fully integrated early and continuously throughout the developmental cycle for new materiel systems. That regulation contains brief descriptions of each of the key IPS actions and events which must be accomplished during each phase of the Life Cycle System Management Model for new materiel. This handbook identifies the major sources of input data and information required to accomplish key IPS actions and events, how to access that data/information, and the general procedures for accomplishing key IPS events. It also describes the relationship between the IPS management model and the Life Cycle System Management Model.

B. SCOPE

The IPS model is designed to support the development of personnel and training subsystems for new materiel systems. Therefore, the model must be closely integrated with the Life Cycle System Management Model as described in DA Pamphlet 11-25. Toward this end, both models have been subdivided into the same four phases: the Conceptual Phase, the Demonstration and Validation Phase, the Full-Scale Engineering Development Phase, and the Production and Deployment Phase.

During each of these phases, those responsible for the development of the training subsystem must assure that certain actions are accomplished. These actions and associated IPS events are displayed in Figures 1 through 4 of TRADOC Regulation 600-4, which are reproduced in Section II of this handbook.

Each IPS event is described in this handbook and the following information is provided:

a. The required inputs or data base for each event.

b. The general procedures for assessing input data and information.

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c.   The general procedures for accomplishing the event.

d.   Event outputs or products and their use
     relative to other IPS events.

e.   The relationship between the event, the IPS
     model, and the LCSMM.

Throughout this handbook special emphasis is placed on iden-
tifying sources of information and data. Wherever possible, mention
is made of reference material to which the reader can turn for addi-
tional information about the event under discussion.

For many IPS model events, suitable sources of information and/or
fully developed procedures for accomplishing the event could not be
located during the compilation of this handbook. Such information
gaps were identified as "technological gaps" and are the subject of a
separate report.

It should be noted that new techniques and procedures were not
developed for this handbook. Rather, the handbook assembles and
organizes the available information, from a wide range of references,
about various procedures that might be followed to accomplish IPS
events.

C.   BACKGROUND

The process by which Army materiel systems are initiated, vali-
dated, developed, deployed, and supported is described in the Life
Cycle System Management Model (LCSMM). That model outlines the
general procedures for the development and acquisition of Army systems
from inception through disposal.

Because personnel and training requirements have not been given
due consideration during the early development of new systems, field-
ing an adequately manned new system is often delayed. Increases in
the sophistication of systems and potential decreases in the number
and skill level of future operator and maintenance personnel, promise
to make this problem more serious. In addition, DOD and DA are
collapsing the development cycle of many systems; some have been
halved.

These developments require that personnel and training factors
be considered early in the cycle if fully qualified operator and
maintenance personnel are to be available by the time the materiel
system can be operational. To implement early development of the
training subsystem and increase responsiveness, the position of TRADOC
System Manager (TSM) was established.

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A TSM is the TRADOC representative for a particular system. He is not a doer--he is an energizer, organizer, integrater, and expediter. He ensures that all user activities needed to support development of a system are started in a timely fashion and integrated into the materiel development process. He is the counterpart to the DARCOM Project Manager (PM) and is responsible for providing all user input for his system to the PM.

TSMs are designated for DA major materiel systems and selected non-major systems (AR 71-9). In addition, Points of Contact (POCs) are designated for all minor materiel systems under development by the Army. Both TSMs and POCs reside at a proponent school and are responsible for managing the development of the training subsystem. Essentially, POCs are responsible for the same IPS actions and events as TSMs.

Typical of the TSM/POC responsibilities are planning for training, personnel, logistics, and testing; acting as primary user; interface with DARCOM PM; preparing TRADOC positions and presentations for materiel acquisition decision reviews (IPR/ASARC/DSARC); and participating in the PM contractual actions to ensure compatibility with user requirements.

The IPS events directly relate to the accomplishment of LCSMM activities. Many IPS events cannot begin until certain LCSMM events have been accomplished; the outputs of most IPS activities are inputs to critical LCSMM events. Therefore, the relationship between the two sets of events must be understood by both the DARCOM Project Manager and the TRADOC TSM. This handbook describes in detail the relationship between these two sets of events.

Regulations exist that establish policies, procedures, and responsibilities for accomplishing both the LCSMM and the IPS events. For a few of these events, DA or TRADOC pamphlets have been prepared describing in more detail how to accomplish these events. However, the procedures for accomplishing most IPS events have not been fully formulated and in numerous cases still await development.

D.   ORGANIZATION OF HANDBOOK

This handbook identifies sources of training information relating to the Life Cycle Systems Management Model (LCSMM) and is designed to be used as a reference book. It is purposefully redundant, in order to provide the user with the appropriate information on a particular event or activity without the need to read the entire document. Cross-referencing, in general, is limited and normally refers to the adjacent event.

Sections III through VI describe the recommended training information inputs to the LCSMM for Phases I through IV, respectively, and provide general procedures for developing this information. Each of these sections, or phases, is subdivided into the major Events occurring within that phase. These Events may be requirements documents, information gathering activities, or supporting evaluations for other Events, but each requires some input of training information or has some impact on the development of the training subsystem.

The Events identified and described in this handbook relate directly to the Events of the Integrated Personnel System (IPS) as set forth in TRADOC Regulation 600-4. In a few instances an Event has been subdivided to allow for more detailed discussion of the activities within the Event, but the original number is retained.

The handbook is designed so that the TSM/POC having questions about a particular Event can go directly to the description of that Event and determine:

   a.   Purpose
   b.   Relationship to LCSMM/IPS events
   c.   TSM/POC responsibilities
   d.   Phasing
   e.   Procedure for accomplishment
   f.   Input data required and the source of the data
   g.   Outputs expected and their use
   h.   References for more detailed regulations and procedures
   i.   Examples where applicable

Cross-referencing to related events is provided if a broader perspective would be helpful.

The events are presented in diagramatic form in Section II as Figure II-3 through II-6 and repeated at the back of the handbook. Those at the back are larger versions to simplify use with the text material. They include a page reference for each event.

The appendices of this handbook are a glossary of terms, a list of abbreviations and acronyms and a list of references.

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SECTION II

MATERIEL ACQUISITION MANAGEMENT MODELS

A. LIFE CYCLE SYSTEM MANAGEMENT MODEL (LCSMM)

The process by which the Army acquires materiel systems is governed by the Army's Life Cycle System Management Model (LCSMM). The sequence of the events that comprises this model is described in DA Pamphlet 11-25. These events are further described in TRADOC Pamphlet 71-12, which provides an overview of the four phases of the LCSSM. Some of the key features of the LCSMM are depicted in Figures II-I (from AR 1000-1) and II-2 (adapted from Mitre Corporation, A Guide for TRADOC System Managers). The four phases can be summarized as follows:

Conceptual Phase. During this phase, alternative concepts for obtaining a desired operational capability are examined. Initial investigations lead to an identification of (1) the basic nature and characteristics of the proposed system(s) and (2) further issues in need of examination. During the remainder of this phase, the concept for one or more alternative systems is further refined, analyzed, and compared. The results of these studies are incorporated into a Concept Formulation Package (CFP) that forms the basis for the development of an Outline Acquisition Plan (OAP) describing proposed procedures for acquiring the proposed system(s). The OAP contains a description of personnel and training requirements prepared under the direction of the training developer (usually TRADOC).

Demonstration and Validation Phase. During this phase, advanced development prototypes of the proposed system(s) are developed, usually under contract. The design features and operational utility of the prototypes are then assessed in a series of tests. On the basis of the test findings, the Concept Formulation Package that was developed during the Conceptual Phase is further refined. If the Developmental Test (DT I) and Operational Test (OT I) are reasonably successful, the system design is further refined as the concept of how the system is to be employed develops. This information is incorporated into a Required Operational Capability (ROC) document, a plan for acquiring an advanced Engineering Development Prototype is prepared, and a decision to continue or not to continue materiel development is made.

Full-Scale Engineering Development Phase. During this phase, an advanced design of the materiel system, as well as all support systems and items, is developed and tested. Following this, the system Acquisition Plan is updated and a decision is made on the suitability of the system for deployment. An affirmative decision leads to a production contract award.
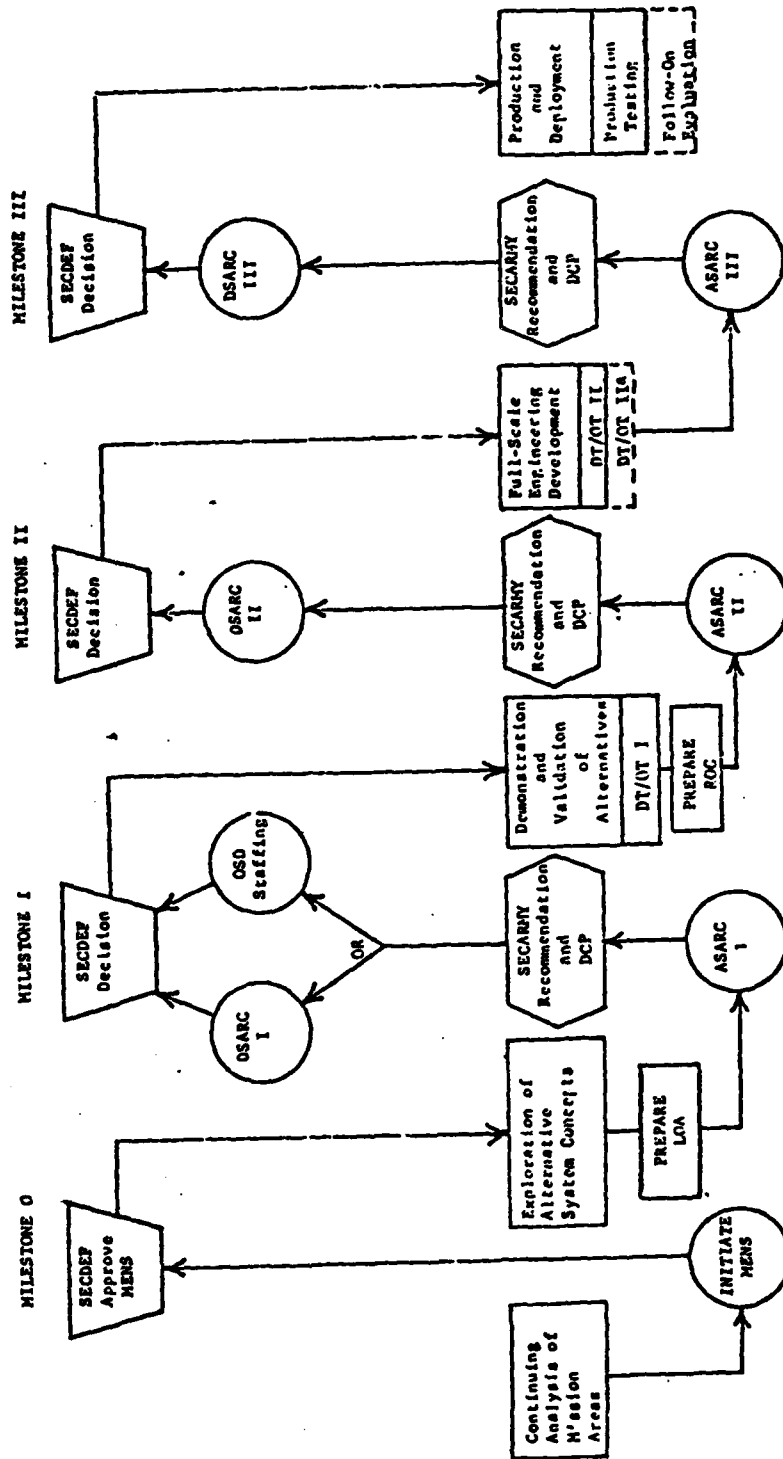
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Figure II-1, Materiel Acquisition Process for Major Systems (from AR 1000-1)

LCSMM PHASES →	I - EXPLORATION OF ALTERNATIVE SYSTEM CONCEPTS	II - DEMONSTRATION AND VALIDATION	III - FULL SCALE ENGINEERING DEVELOPMENT	IV - PRODUCTION AND DEVELOPMENT
DECISION REVIEWS DSARC		II	III	
ASARC	I	II	III	
IPR				
BASIC SUPPORTING DOCUMENT	OCO/STO MENS LOA OAP	ROC AP VAL	DEVA	
TESTING	DT I OT I	DT II OT II FDTE	OT II OT II OT/DT IIa (AS NEEDED)	PRODUCTION TESTS FAT (PPT, IPT) OCA ICT FOE
HARDWARE CONFIGURATION	BREADBOARD & EXPERIMENTAL PROTOTYPE	BRASSBOARD & ADVANCED EDEVELOPMENT PROTOTYPE	ENGINEERING DEVELOPMENT PROTOTYPE	INITIAL PRODUCTION ITEMS FULL PRODUCTION ITEMS

ASARC - ARMY SYSTEM ACQUISITION REVIEW COUNCIL
DEVA - DEVELOPMENT ACCEPTANCE
DSARC - DEFENSE SYSTEM ACQUISITION REVIEW COUNCIL
AP - ACQUISITION PLAN
DT I (II) - DEVELOPMENT TEST I (II)
FDTE - FORCE DEVELOPMENT TESTING AND EXPERIMENTATION
FOE - FOLLOW-ON EVALUATION
IPR - IN-PROCESS REVIEW
LCSMM - LIFE CYCLE SYSTEM MANAGEMENT MODEL

LOA - LETTER OF AGREEMENT
MENS - MISSION ELEMENT NEEDS STATEMENT
OCO - OCCUPATIONAL CAPABILITY OBJECTIVE
OAP - OUTLINE ACQUISITION PLAN
OT I (II) - OPERATIONAL TEST I (II)
ROC - REQUIRED OPERATIONAL CAPABILITY
STO - SCIENCE AND TECHNOLOGY OBJECTIVES
VAL - VALIDATION

Figure II-2. System Acquisition Cycle

Production and Deployment Phase. During this phase, operational units are trained, system deficiencies identified in testing are corrected, equipment is procured and distributed, and logistic support is provided. Follow-On Evaluations (FOE) may occur once the new system becomes operational.

As implied in Figures II-1 and II-2, a decision to enter the next phase of the LCSMM model is based on a review of:

(1) The adequacy of the design, development, and testing activities accomplished to date along with a review of conclusions derived from those activities. This information is contained in key supporting documents prepared prior to review milestones.

(2) The continued existence of the threat or other conditions/ operational deficiencies that led to initiation of the project.

As the materiel acquisition process continues, the materiel concept progresses through the following stages: (1) from a general to a specific concept (Conceptual Phase); (2) from a specific concept to validated prototype hardware (Validation Phase); (3) from prototype hardware to improved materiel that has received a full-scale test (Full-Scale Development Phase); and (4) from fully tested materiel to operational equipment (Production and Deployment Phase). During this process plans for obtaining skilled personnel develop from general concepts into concrete and validated training programs and associated training devices. The goal of LCSMM, and of the IPS model to be discussed next, is to have a fully developed and validated training program in place by the time the materiel is ready for operational use.

As noted in AR 71-9, Chapters 3 and 4, the decision to start development of a new materiel system under guidance of the LCSMM is based on the approval of a Mission Element Needs Statement (MENS). A MENS identifies and supports the need for a new or improved mission capability. The MENS therefore usually justifies starting new major system acquisition, thus beginning a Program Initiation (Milestone 0) in the LCSMM process. The preparation of a MENS is based on the continuing assessment of the need for new materiel, based both on perceived future threats and on the desire to take advantage of advances in new technology.

The preparation of a MENS, and the research and analysis upon which it is based, can be viewed as a preliminary phase to the four phases of the LCSMM. This stage has been called by names such as the Concept Initiation Phase or the Program Initiation Phase (see Figure II-3).

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II-2). In AR 71-9 it is discussed in Chapter 3 under the heading, Initiation of Potential Materiel System.

B. INTEGRATED PERSONNEL SUPPORT (IPS) MODEL

Integrated Logistic Support (ILS) is the process by which the Army obtains reliable, maintainable, transportable, and supportable equipment at the lowest cost of ownership. Concurrent with the materiel acquisition process, the Army must develop, acquire, test, and deploy the required support resources for the new materiel system. Such resources, collectively referred to as system support, include support and test equipment, skilled personnel (including the training programs and training devices needed to develop the operations and maintenance skills), supply support, technical logistical data, and facilities. The process by which skilled personnel and the necessary attendant training programs are acquired is described by the Integrated Personnel Support (IPS) model, TRADOC Regulation 600-4.

ILS events and activities must be carefully coordinated with those materiel development events that are the responsibility of the Project Manager of the system. One way of describing this coor-dination is in terms of the key documents that must be produced during each phase. Each document must address training issues. It is the responsibility of the TSM or POC to assure that these issues are addressed for the system, that the results are incorporated into the appropriate documents, and that a time schedule agreed upon by the system PM and TSM/POC is followed.

As an illustration, Figure II-2 shows that during the Conceptual Phase two key supporting documents must be produced, the Letter of Agreement and the Outline Acquisition Plan. The LOA is jointly pre-pared by the combat and materiel developers. One portion uses inputs provided by the TSM and identifies the critical features of the per-sonnel system that should be investigated further. These issues relate to three general areas--personnel investigations, training requirements, and personnel requirements. Following approval of the LOA, the TSM/POC guides the development of preliminary training plans and the investigation of personnel and training requirements.

Alternative training approaches may be considered during this Phase. If required, their cost and effectiveness are examined (COEA/CTEA studies) and the findings are incorporated into the Concept Formulation Package. This CFP is a key element in the OAP.

Concurrently, draft plans for obtaining skilled personnel are developed in the form of the Qualitative and Quantitative Personnel Requirements Information (QQPRI) and the Individual and Collective

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Training Plans (ICTP). Towards the end of the Conceptual Phase, a Best Technical Approach (BTA) will be identified that describes the materiel and operational characteristics of the proposed hardware system. The TSM/POC then refines existing training plan outlines to describe how the training system for the proposed materiel system will be developed.

The development of a training system is based on the iterative consideration of a variety of factors, all of which can be subsumed under the terms personnel investigation, training requirements, and personnel requirements. These terms are discussed in TRADOC Regulation 600-4 and DA Pamphlet 11-25 and in later portions of this handbook.

During Phase I of the LCSMM/IPS model, the training system developer identifies the critical training issues and the personnel developer identifies the critical personnel needs that should be investigated. The initial examination of these issues then begins. In subsequent phases of the LCSMM/IPS model, plans for training and for obtaining skilled personnel are tested and refined.

As the materiel system progresses through its developmental cycle, its design configuration becomes more stable and definitive. More detailed information becomes available about the system and its operational employment. As this occurs, the training developer can become more precise about personnel requirements, individual and collective training plans, required training materials and devices, and procedures for validating training device and materials.

The procedures by which training systems are developed are described in such documents as the Army's ISD manuals, Military Standards for the preparation of Special Performance Aids (SPA) materiel, and the joint DARCOM/TRADOC Technical Documentation and Training Acquisition Handbook. The procedures described in these documents are most applicable to existing materiel systems because data from such systems are readily available. The process whereby these procedures are adapted to new materiel systems has yet to be described in detail. However, a general overview of these procedures has been available for some time.

The process for adapting procedures is based on what is known as "comparability analysis," which involves analyzing materiel in terms of its similarity to existing materiel. The objective is to identify subsystems and functions of a proposed system that appear to be quite similar or identical to existing systems. For those judged to be similar, historical data from the existing system are used to make initial training-related decisions about that portion of the new system. Those portions of the new system that are, or seem to be,
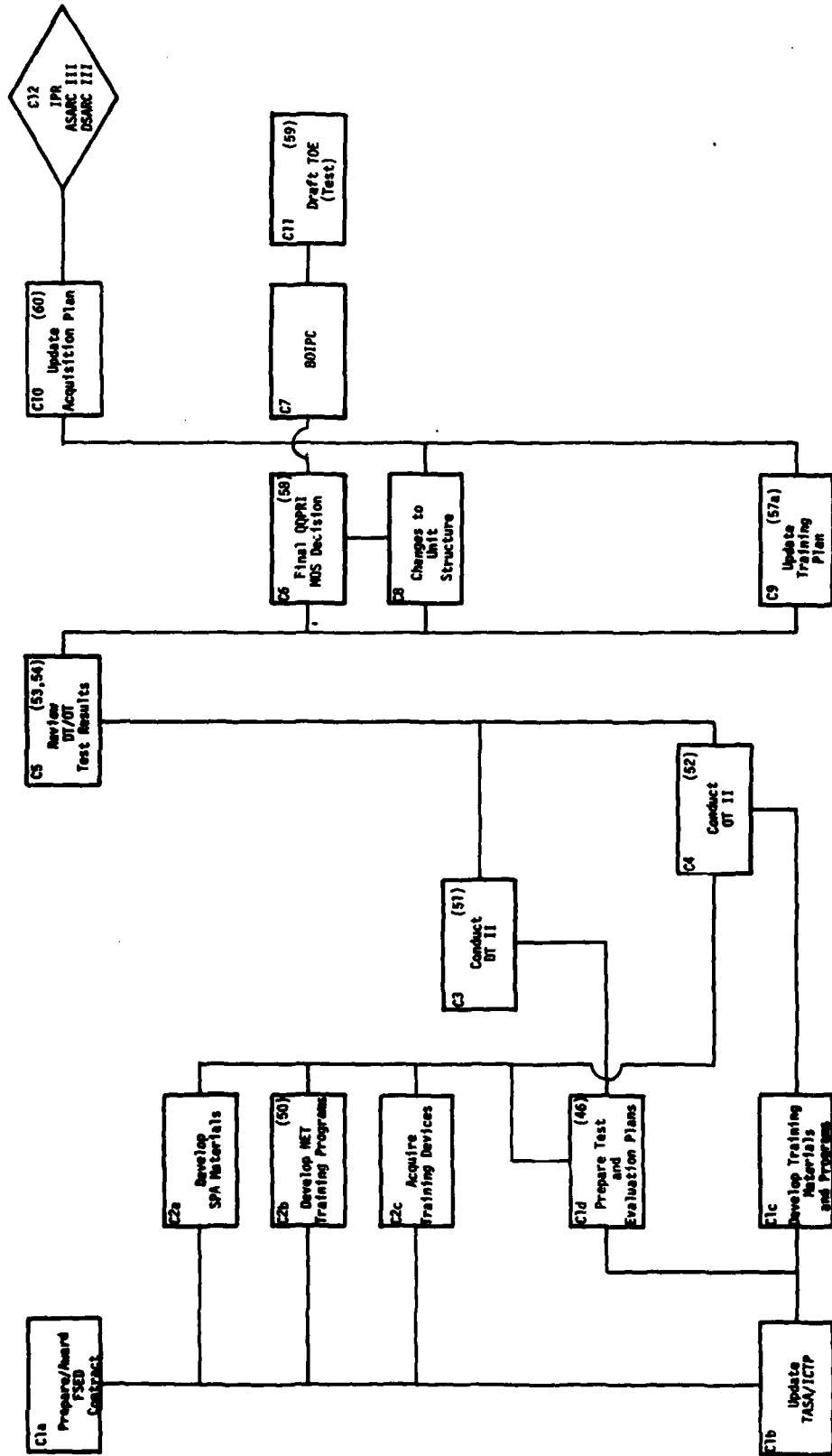
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Conceptual, Phase I

Figure 1-3. Flow Diagram of Major Events, Phase 1, LCSMM

Figure II-3. Conceptual Phase, LCSMM

Demonstration and Validation, Phase II

Figure II-4. Demonstration and Validation (DUAL) Phase, LCSMM

Full-Scale Engineering Development, Phase III

Figure II-5. Full-Scale Engineering Development (FSED) Phase, LCSMM

PRODUCTION AND DEPLOYMENT PHASE IV

LEGEND

IPS Event Blocks (TRADOC Regulation 600-4)

LCSMM Blocks (DA Pamphlet 11-25)

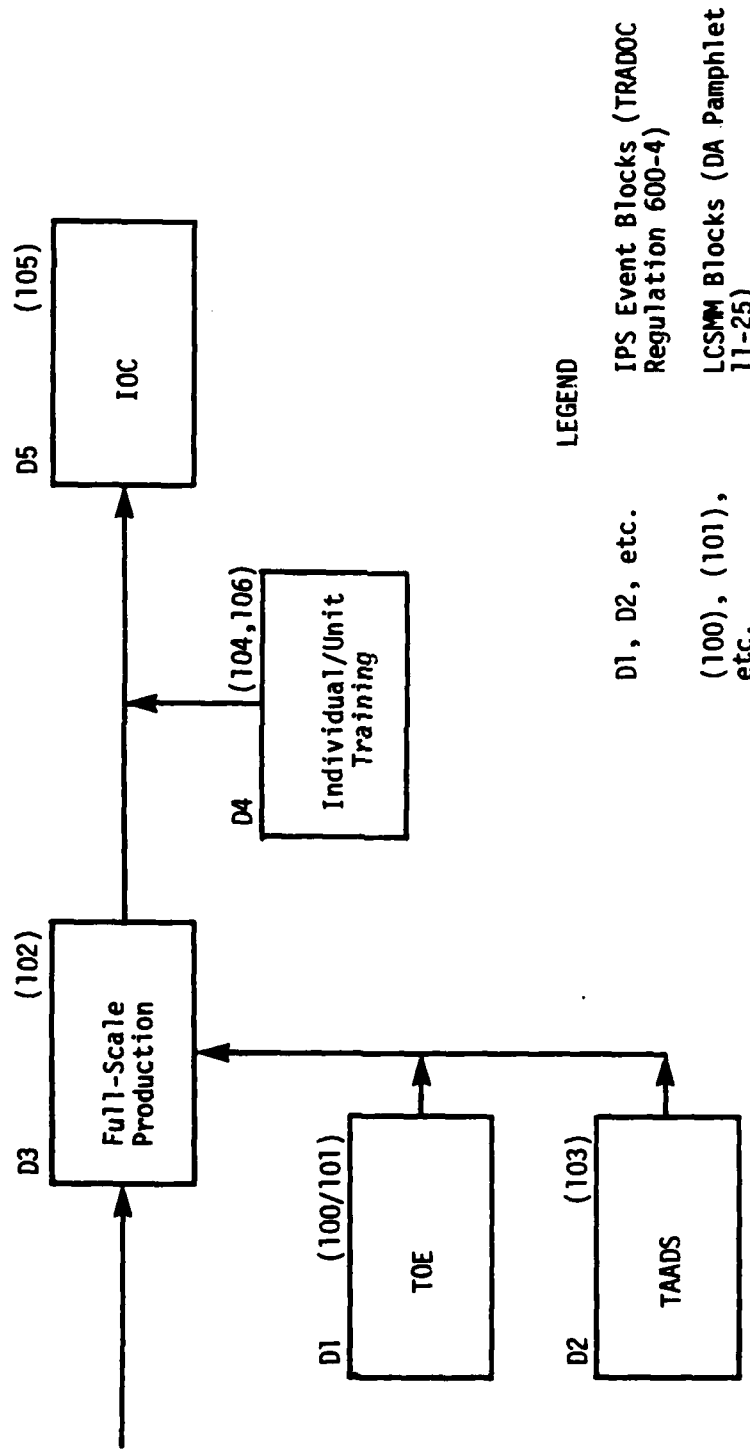D1, D2, etc.

(100), (101), etc.

Figure II-6. Flow Diagram of Major Events, Phase IV

different from existing systems are initially analyzed by a group of training and materiel development experts. This group attempts to determine whether the "new" portions of a proposed system impose special requirements on the training system. For example, if new skills are required, will special training devices be necessary?

During the Conceptual Phase, plans and recommendations regarding training are based both on historical data obtained from similar systems and on information developed on the basis of professional judgment. Following development of prototype equipment during Phase II, and especially after the Operational Testing of the prototype (OT I), more task analytic data will be available to replace that developed by professional judgment. These data will be refined further on the basis of an analysis of Engineering Development Prototype materiel and the operational test of that materiel (OT II). Thus, as the training system is developed, the data base for the system will progress from a mix of data based on historical records and professional judgment to data derived from the new materiel system. Concurrently, the data base will become more detailed and valid.

C. RELATION OF LCSMM AND IPS MODELS

The major IPS model events that occur during each of the four phases of the LCSMM are shown in Figures II-3, II-4, II-5 and II-6, respectively. The numbers in () above and to the right of most blocks refer to numbered LCSMM event blocks as presented in DA Pamphlet 11-15. The alphanumeric codes above and to the left of most blocks refer to IPC event blocks, as shown in Figure 1 through 4 of TRADOC Regulation 600-4.

The events in the upper row are key events in the LCSMM. The training developer provides critical inputs to these events and participates in the accomplishment of most events. Therefore, most key events in the LCSMM also are key events in the IPS model.

Events shown in the remainder of Figures II-3 through II-6 are the responsibility of either the combat developer or the training system developer. The actual preparation is generally conducted at the TRADOC proponent schools. .

Throughout this handbook the interrelation between the LCSMM and the IPS model will be emphasized. IPS-related activities are initiated by one or more LCSMM events and depend on these events for critical inputs, especially information derived from prototype equipment. All requirements or supporting documents produced during the LCSMM process must address personnel and training issues and are, therefore, dependent on inputs from IPS events.

In the following sections of this handbook, major IPS events are discussed and the interrelation among an IPS event and other events in the LCSMM or IPS process is amplified.

SECTION III

IPS MODEL: CONCEPTUAL PHASE

A. OVERVIEW

The primary training activities during the Conceptual Phase are:

- o Evaluation of the proposed materiel system concept in terms of training implications.
- o Establishment of a preferred training concept.
- o Development of associated data, in sufficient detail to support training requirements planning and decisions on initiation of system programs.

During this phase the training developer prepares portions of and provides inputs to three requirements documents: the Letter of Agreement (LOA), the Concept Formulation Package (CFP), and the Outline Acquisition Plan (OAP). As part of the Materiel Concept Investigation process, the training developer makes a gross estimate of the training requirements and identifies critical issues that should be investigated during preparation of the CFP. This information is incorporated into the LOA.

After the LOA has been approved, a Special Task Force or Special Study Group may be formed to study the alternative conceptual approaches noted in the LOA. The TRADOC TSM/POC will be part of this group. The training developer is responsible for drawing up a draft training plan and making an initial determination of the cost and effectiveness of that plan. In addition, he may be asked to assist in formulating the organizational and operational concepts for the proposed system. Information about these concepts, plus the training support plan and associated cost and training effectiveness analyses (CTEA), provides inputs to the major studies that must be peformed as part of developing the CFP.

The initial investigation of personnel requirements may have identified critical issues in need of exploration. In addition, a standard set of issues must be studied for each new materiel system. The results of these studies provide the basis for the personnel and training portion of the Outline Acquisition Plan.

It should be noted that during the Conceptual Phase more than one materiel concept may be investigated. The training developer must identify special training problems, prepare a training plan, and conduct a CTEA for each materiel concept. Also, for any particular materiel concept two or more approaches to obtaining skilled personnel

may look equally cost-effective. The approaches should be studied separately and then compared as to cost-effectiveness.

B. **SCOPE**

Section C contains information on each of the 12 major events that must be accomplished during Phase I of the LCSMM. These events are depicted in Figure II-3 and in the Phase I chart in the back of this handbook. For each event the following information is provided:

1. Purpose of event
2. Relation to LCSMM/IPS events
3. TSM/POC responsibilities
4. Event phasing
5. General summary of technical procedures for accomplishing event
6. Input data or event data base, along with information about:
    (a) Data sources
    (b) When data are available
    (c) How to obtain data
7. Event outputs and end products, including information about:
    (a) Format requirements
    (b) Use of outputs
    (c) When output should be available
8. References, including technical "how to do it" information.
9. Examples of outputs, when available.

C. **DISCUSSION OF EVENTS**

1. **EVENTS A1 AND A2--MATERIEL CONCEPT INVESTIGATION AND PERSONNEL INVESTIGATIONS**

    OVERVIEW

    Purpose. During the Materiel Concept Investigation (A1) the materiel developer examines various ways of meeting the requirements contained in a Mission Element Needs Statement (MENS). From these studies will emerge one or more materiel concepts, along with a concept of how each would be operationally employed, manned, and supported.

    While these materiel concepts are being formulated (A1),the TRADOC proponent examines, for each materiel concept, the feasibility of obtaining the needed manpower, the qualifications of persons required to man the proposed system, and the training requirements. Events A2, A3, and A4 collectively result in preparation of a training

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concept, and their products form the basis for the training plan and the list of training and personnel issues that must be included with materiel concepts in the LOA (Event A5).

During this period the TRADOC proponent must work with very sketchy data. Thus, the plans formulated during Event A2, Personnel Investigations, are essentially hypotheses that must be validated later. The primary goal of this event is to identify possible ways of obtaining personnel for the proposed system, and especially critical issues that should be investigated further. Other A2 goals include identifying areas where (a) excessive demands may be placed on human resources and (b) excessive materiel requirements may be reduced by assigning certain system functions to the human component. Any constraints on the numbers and/or types of personnel for the new system should be specified.

Relation to LCSMM/IPS Events. When possible, the A2 event and its companion investigations, Training Requirements (A3) and Personnel Requirements (A4), should be performed in conjunction with the Materiel Concepts Investigation (A1). In practice, activities in A2, A3, and A4 are not apt to begin until some time after the Materiel Concept Investigation is underway, when a materiel concept has been described in enough detail to provide usable inputs for personnel investigation considerations.

On the Phase I chart, the output of the Personnel Investigations (A2) is shown feeding into Training Requirements (A3). In practice, Events A2, A3, and A4 all employ a similar data base and may be performed concurrently by the same persons. Thus, considerable exchange of information usually occurs among these three events. The findings and issues developed during these events eventually are incorporated into the Letter of Agreement (LOA). Before proceeding with event activities, training developers should learn what types of personnel and training-related information must go into the LOA (Event A5, page III-18).

TSM/POC Responsibilities. The TSM/POC, in coordination with the ADMINCEN, should identify the personnel issues to investigate during Event A2.

Phasing. Event A2 can begin concurrently with the beginning of the Materiel Concept Investigation (A1). However, it is likely to begin some time later on, when more information will be available. The personnel investigations should be completed and all critical issues identified by the time the LOA preparation begins.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A2

As the Materiel Concept Investigation proceeds, the materiel developer and the combat developer, working jointly, will consider various concepts. They will translate the most promising into system descriptions, dealing with what the system is to accomplish and who or what will perform various system functions. Eventually, they will accept one or two concepts for further investigation and they will prepare a mission profile. The profile "consists of a list of 'tasks and conditions' for system employment in military operations" and will be included in the LOA (Event 5) as Annex A. From the mission profile, the concept investigation will provide a description of the proposed system's characteristics, and support concepts, and a list of possible constraints.

About half way through the materiel concept process, enough information should be available so that the training developer can begin to identify personnel and training considerations. This should be done in concert with representatives of the ADMINCEN.

There are no established procedures for identifying personnnel and training requirements at the time of Materiel Concept Investigation. However, many developers follow a course of action based on two general procedures, functional analysis and comparability analysis.

Personnel and training decisions ought to be based on a job/task analysis. During the conceptual phase of the LCSMM this may seem impossible, but it can be done. An examination of the operational concept and a preliminary version of the mission profile for a proposed system will indicate (a) the major subsystems of the proposed system and (b) the role of operator and maintenance personnel with respect to these subsystems. Even at this early stage a matrix can be developed that describes, for each subsystem, the functions of system operators and maintenance personnel.

At this point, the "performance requirements" or functions of the systems human components need be stated only in general terms, (e.g., acquire targets or perform direct support maintenance on engine). Further analysis of the proposed operational environment should identify major factors that might impact on desired performance, such as excessive heat, vibration, noise, and stress due to workload or enemy attack. After this functional analysis matrix is developed, the combat and materiel developers should collectively identify those human functions that seem most critical to mission accomplishment. This step is accomplished on the basis of professional judgment. Subsequent analyses should concentrate on these functions.

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With rare exceptions, new systems replace existing systems and are similar in many ways to those they are to replace. For this reason the initial analysis of a new system can be based in part on a "comparability analysis," to identify the subsystems and components of a new system that are the same as, or similar to, those of an existing system.

A comparability analysis begins by examining each subsystem of a proposed system to determine whether it is (a) conceptually similar to an existing system and/or (b) physically and functionally similar to an existing subsystem. This analysis can utilize the matrix developed during the functional analysis described above. To the extent that the new and existing systems have similar subsystems, historical data can be used to identify personnel and training requirements.

While a proposed system may have subsystems that are conceptually similar to those of present systems, the proposed human functions of these subsystems may be different. For example, the materiel concept might involve using a remotely operated tank instead of one operated by a driver, or a proposed new radar may use built-in test equipment rather than direct support maintenance personnel. Thus, the comparability analysis involves identifying whether, for similar subsystems, the manner in which they will be operated and maintained is or is not to be changed.

Six important questions should be addressed during the Personnel Investigations (Appendix A, TRADOC Regulation 600-4):

a. Can it reasonably be assumed that soldiers with the required mental and physical skills will be recruited and made available to operate and maintain the proposed system?

b. Will current or future manpower authorization support the system?

c. What will be the impact on the current personnel structure?

d. Will personnel trade-offs be required? What will be the effect on proposed system objectives?

e. What is the human resources development impact of the proposed system?

f. What cost-effective trade-offs are possible to capitalize on the human resources aspects for the system instead of materiel aspects?

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Information bearing on these questions, plus any others that seem important, should be identified in cooperation with ADMINCEN personnel. These are the questions that must be examined during later portions of Phase I of the LCSMM. Also, these questions must be addressed both in the Letter of Agreement and in the Outline Acquisition Plan. For each personnel-related question a tentative answer should be developed. The data for this step will come from recruitment plans, projections of the force structure, and projections of future available manpower.

During the Materiel Concept Investigation, it will not be possible to identify personnel requirements precisely. However, it should be possible to identify the range of options to consider. As an example, for a proposed system, an analysis of the mission profile and the system concept should provide some estimate of officer and EM requirements. To the extent possible, these estimates should be based on comparing the proposed system and existing systems. The general options to consider are (a) the same numbers and types of personnel, (b) greater or smaller numbers of the same types of personnel, and (c) greater or smaller numbers of different types of personnel. Of these three options the most reasonable ones should be examined in more detail. Once identified, they can be studied in conjunction with ADMINCEN to identify the options that are feasible in terms of future recruitment plans and manpower authorization and those that would have the least impact on future force structure.

INPUT DATA/DATA BASE FOR EVENT A2

a.   Mission Element Needs Statement (MENS)

Description: A Mission Element Needs Statement (MENS) identifies and supports the need for a new or improved mission capability, described in terms of the operational tasks to be accomplished. Information contained, and of interest to the training developer, includes: identification of the mission areas and mission elements to be performed; statement of the deficiency addressed by the MENS; known constraints that apply to any acceptable solution; and plans to explore solutions to the deficiency, to include establishment of a TRADOC TSM office following program initiation (Milestone 0).

Data Sources: DARCOM or TRADOC.

When Available: Should be immediately available since it is the document that describes the need for the materiel concept under investigation.

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b. Science and Technology Objectives Guide

Description: The Science and Technology Objectives Guide (STOG) defines the capability required to meet a perceived threat or defines a deficiency that can be corrected by improved technology. STOG provides the baseline from which system and subsystem developments are initiated.

Data Sources: DARCOM or TRADOC.

When Available: Should be immediately available.

Access Procedure: Request from HQTRADOC, ATCD-SM.

c. Materiel Concept Descriptions

Description: For each materiel concept seriously considered during the Materiel Concept Investigation, the materiel developer will prepare a description of the support concept, human functions, operational environment, and any known constraints. This information forms the basis for the functional and comparability analyses conducted by the training developer. These analyses provide the data needed to make initial determinations about personnel and training requirements.

Data Sources: Persons/agencies preparing materiel concept, usually DARCOM.

When Available: About midway through the Materiel Concept Investigation. Refinements may continue right up to preparation of the LOA.

Access Procedures: If possible, training developer should work closely and continuously with materiel developer in order to have immediate and ready access to these data. Otherwise, he should schedule a series of meetings to review written documentation as well as recent ideas.

d. Mission Profile

Description: This profile describes the operational requirement(s) that a system must meet to accomplish a particular mission or set of missions. It includes the expected mix of ways in which the new system will be used in carrying out its operational role, and the expected percentages of time that it will be exposed to various types of environmental/training conditions during the system's life.

Data Source: Combat developer.

When Available: Mission profile must be included in LOA but may not be in final form before LOA preparation begins. Since the training developer needs this profile some months earlier, if at all possible the combat developer should try to produce a tentative profile for the training developer's use.

Access Procedure: Request from combat developer.

e. Historical data from similar systems

Description: These data can provide the basis for estimating personnel and training requirements. In particular, they can be used to identify current problems in obtaining various types of personnel or to identify problems related to training.

Data Sources: Schools having proponency for similar systems.

When Available: Should be immediately available.

Access Procedures: Obtain from visits to proponent schools, study of related TOEs, POIs, SMs, ARTEPs.

f. Future plans for recruitment, force structure, and manpower

Description: This information can be used to estimate the feasibility of obtaining certain types of persons in certain numbers by some future date. It provides a basis for estimating constraints on obtaining personnel, and as competition for similar persons by different materiel systems.

Data Sources: ADMINCEN and MILPERCEN

When Available: As needed.

Access Procedures: In conjunction with ADMINCEN, formulate questions regarding the availability of various types of persons by number. As appropriate, request MILPERCEN or ADMINCEN to develop answers to questions.

g. Professional judgment of Subject Matter Experts (SMEs)

Description: Certain portions of a proposed new system will be judged to be different enough from existing systems that historical data cannot be used to estimate personnel requirements. For these portions materiel and combat

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developers, along with training developers, will have to make "best guesses" as to personnel requirements.

Data Sources: Persons familiar with the new system concept and/or similar systems.

When Available: After the materiel concept has been described in some detail, but before preparation of the LOA.

OUTPUTS AND END PRODUCTS FOR EVENT A2

a. Description: A paper, incorporating discussions with appropriate SMEs, that (1) outlines the personnel/manning concept for the proposed system and (2) lists the personnel issues that need further investigation. This paper should be attached as an annex to the LOA (Event A5), and the contents of the paper and the issues for further study should be summarized in the LOA. For information on format, see AR 71-9 and the discussion of the LOA contained in this handbook.

b. Output Usage: Provides inputs to LOA and is attached as an Annex to LOA.

c. Availability Requirement: By the time preparation of LOA begins.

REFERENCES

AR 10-38, U. S. Army Concepts Analysis Agency
AR 71-5, Introduction of New or Modified Systems/Equipment
      (to be replaced by AR 350-XXX)
AR 71-9, Materiel Objectives and Requirements
AR 310-49, The Army Authorization Documents System (TAADS)
TRADOC Regulation 700-1, Integrated Logistic Support
DARCOM-TRADOC, Materiel Acquisition Handbook,
MITRE Corporation, A Guide for TRADOC System Managers,
ARI-TR-78-A7, TSM Guide to Training Development and
      Acquisition for Major Systems
Goclowski, J. C. et al., Integration and Application of Human
Resource Technologies in Weapon System Design: Coordination
of Five Human Resource Technologies, AFHRL-TR-78-6(I)

2. EVENT A3--TRAINING REQUIREMENTS

OVERVIEW

Purpose. The Training Requirements event, and Events A2 and A4 collectively result in preparation of a training concept and the first iteration of a training development model. The products of these three events form the basis for the training plan and the list of training and personnel issues that must be included in the LOA. TRADOC Regulation 600-4 suggests that Event A3 begin with a rough task and skill analysis.

Relation to LCSMM/IPS Events. This event is one of three inter-related events conducted by TRADOC personnel during the Materiel Concept Investigation. The results of Event A3 form the basis for certain sections of the LOA. Therefore, before proceeding with event activities, the training developer should study the LOA format to identify training topics that must be addressed in that document. (See Event A5, pages

In practice, Events A2, A3, and A4 are so closely intertwined that they must make use of the same data base. Therefore, the functional and task analysis activities described in this handbook under Event A2, (page III-2) provide the data base Event A3. During Event A3, it is important to identify a possible requirement for training devices or embedded training, and the need to investigate special training problems. The product of this event, a basic training plan, will continually be updated, critically examined, and validated throughout the LCSMM. Although constrained by the lack of detailed data, the proposed training plan and the training issues needing further investigation should be as comprehensive and detailed as possible.

TSM Responsibilities. Training concept development will be assigned to a proponent school; a training representative will be assigned for a specific system. This designated representative, along with a TSM if present, has the responsibility for (a) developing the training concept; (b) coordinating concept development with other interested schools; (c) coordinating development activities with Combat Developments (CD), with support system organizations (Personnel, Logistics, Organization), and with the materiel developer (usually the PM).

Phasing. This event can begin soon after onset of Event A1, Materiel Concept Investigation. It should be completed in time for incorporating end products into the LOA.

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GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A3

Numerous documents have been prepared for describing Task and Skill Analysis (TASA) techniques, identificating training device requirements, developing training plans, and so on. These techniques (ISD procedures, FEA techniques, etc.) all assume that fairly detailed systems data are available. During the time when Event A3 has to be accomplished, however, the proposed system is still in its concept stage, and only sketchy and incomplete data are available.

The suggested general procedures for analyzing functions and tasks at this stage in the LCSMM have been described under Event A2. The use of functional and comparability analysis techniques was recommended. Historical data should be used whenever possible. If this early analysis of fuinctions and tasks has not already been accomplished, proceed as outlined under Event A2 (page III-2). In addition to these data, the other data inputs required for this task are the same as those listed for Event A2 (page III-2).

The output from the functional and task analysis should consist of a matrix which shows, for operator and maintenance personnel, the functional activities they will be responsible for with respect to each major subsystem of the proposed system.

Before this information can be further analyzed, one must develop a list of the training areas (questions) which must be addressed. At a minimum these should include:

o   Who must be trained?
o   What is the training setting?
o   Where should the training take place?
o   How should the training be accomplished (training methods, to include embedded training, training devices, use of SPA material)?
o   What are probable support requirements in terms of facilities, instructors, and so on?

Remember, the goal is to prepare an initial training concept, a rough training plan, and a list of critical issues for further study. All this will be incorporated into the LOA.

Each of the training areas or questions should be examined against the people functional requirements matrices from the TASA activity. A small group of training representatives can best accomplish this, pooling their professional expertise. As needed, additional information and expertise can be sought. As an example, for any particular activity such as "maintain missile guidance system," one can make tentative judgments about: who to train, what the

training setting should be, whether training devices should be considered, whether this system is a candidate for the SPA approach, and so on.

Certain portions of the proposed system will be judged comparable to present system(s) and the human requirements comparable to those now required of Army personnel. In such cases, one should examine present training techniques to identify areas where the training may be deficient, where the training system already is overloaded, or where new technology, especially in the form of new training devices, might be applied. When dealing with materiel subsystems that are quite different from those in existence and/or human functions that seem not to be comparable to any extant requirement, initial decisions must be based on professional judgment.

During this process one should pay special attention to the human functions that are critical for system performance and/or that are judged difficult to acquire even through training. These problem areas should become "critical issues" for further study.

The foregoing procedures are based on the rather similar technique of reviewing potential training requirements and asking the question, "How do we do it now?" The flaw within this approach is that practitioners may fail to ask the appropriate follow-on questions, namely, "How can we do it better?" The development of a new training system presents the opportunity to employ the latest proven technology. Thus, when a training concept is being developed, care should be taken to identify and recommend recent advances in technology.

As an outline of a training plan takes shape, this developer should coordinate it with the persons refining the operational concept for the system. The training plan may have a major impact on system design, especially if the plan calls for the use of imbedded training or of operational equipment for individual training within an operational unit.

INPUT DATA/EVENT DATA BASE

a.   Same as described for Event A2 (items a-g, pages III-6 thru III-8).

b.   Task and skill analysis data (preliminary)

     Description: These data consist of a series of matrices showing the relationship between human performance requirements and various subsystems. The requirements are categorized in terms of being either "new" or comparable

to existing requirements. (Obtaining this information,
either from another event or from direct analysis, should
be first step in execution of Events A2, A3, and A4.)

Data Source: Training system proponent.

When Available: If not available immediately, conduct a
functional and task analysis.

Access Procedures: Obtain from training system proponent or
develop yourself. May have difficulty obtaining some of the
input data referenced above.

c.   Human Factors Requirement/Problems

Description: A description of unusual or critical operator or
maintenance requirements which may be difficult to meet because
of human capability limits. Solutions in terms of system rede-
sign or special training might be suggested.

Data Source: DARCOM.

When Available: During the Materiel Concept Investigation,
DARCOM estimates human factors problems. However, these
estimates often are not developed until late in Phase I
or early in Phase II.

Access Procedure: Through DARCOM, obtain from appropriate engineering
laboratory.

OUTPUTS AND END PRODUCTS

a.   Description: A document which describes (1) a training con-
cept, (2) a training plan outline, and (3) training issues
that require exploration.

b.   Output Usage: Provides inputs to LOA and is attached as
an Annex to LOA.

c.   Availability Requirement: By the time preparation of LOA
begins.

REFERENCES

AR 602-1, Human Factors Engineering Program
TRADOC Regulation 351-3, Resident Training Policy

TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRADOC Pamphlet 350-30, Interservice Procedures for Instruc-
tional System Development
DARCOM-TRADOC, Technical Documentation and Training
Acquisition Handbook.
Documents listed under Event A6 (page III-24)and Event A7.1
(page III-31) may be of some interest although the
procedures discussed in these documents require a
rather detailed data base. Also see listing under
Event A2 (page III-2).

3.   EVENT A4--PERSONNEL REQUIREMENTS

OVERVIEW

Purpose. The purpose of the Personnel Requirements event is to
prepare an initial concept of the types and numbers of persons
required to man the proposed new system. Estimates also are developed
regarding the skills required of all operator and maintenance person-
nel, the unique physical and mental characteristics these persons
should possess, and the means by which any special human resources
requirements will be developed.

Relation to LCSMM/IPS Events. This event bears a close rela-
tionship to Events A2 and A3 and should be conducted by the same per-
sons. In practice Event A4 should be conducted in conjunction with
A3. Event A4 uses the same data base described for Events A2 and A3,
and additional information developed during Events A2 and A3. The
A4 output serves as an input to the LOA and therefore should be
available prior to preparation of the LOA (Event 5 of the LCSMM).

TSM/POC Responsibilities. Proponent school is responsible
for preparing estimates of personnel requirements. TSM/POC should
ensure that these estimates are coordinated with ADMINCEN and MILPERCEN.

Phasing. This event can begin concurrently with the beginning
of Event A2, Personnel Investigations, since both cover similar
ground. The detailed consideration of personnel requirements can
begin part way through Event A3, when a rather detailed consideration
of the requirements of operator and maintenance personnel begins.
Event A4 must be completed in time to incorporate its output into the
LOA.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A4

As in A2 and A3, this event is accomplished through the use of
functional analysis and comparability analysis procedures. The

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Materiel Concept Investigation should provide a concept of the materiel and the role of equipment operators, maintenance personnel and crews. As described for Event A2, the training developer uses this information to make an initial analysis of functions and skills, the goal being to develop a matrix, for each major portion of the proposed system, showing the functional performance requirements of people with respect to the system. A comparability analysis of this matrix then identifies the materiel subsystems and human performance requirements that are comparable to extant systems and requirements. Any further analysis of this data base prior to the LOA is based on either historical data or on professional judgment. Historical data form the basis for making judgments and estimates related to comparable subsystems and personnel requirements. Professional judgments from training and field personnel can be used for new materiel subsystems and new personnel requirements.

As part of Event A3 the human performance requirements are examined with respect to the training requirements imposed by each cell of the matrix. In A4 this analysis is extended to include personnel requirements. For each combination of performance requirement (human) and materiel subsystem, the following questions should be raised:

a.   What MOS and skill level are needed for this performance requirement?

b.   How many persons, by MOS and skill level, are required?

c.   Does performance require persons with special physical or mental characteristics? If so, what are they?

d.   How do we determine the potential availability of required personnel?

e.   If the required people are not available, how do we propose to obtain them or develop a human resource pool?

Answers to these foregoing questions should be based on historical data when possible. MOS and skill level requirements ("a" above), can be estimated by asking such questions as what MOS and skill levels are used with comparable systems, whether these have proven to be the correct MOS and skill levels for manning that type of system, and whether the materiel concept and/or the operational concept suggest that a new MOS or a combined MOS be developed?

Question "b" above can best be answered by consulting the mission profile prepared by those investigating the materiel concept (A1). This profile should describe the number of materiel units required

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for mission accomplishment and the role of the people who conduct the mission. The function and task analysis performed as part of A2 is based on an estimate of the number and type of persons required for a single unit of material. Multiplying these single unit numbers by the number of equipment units required for a mission will provide a minimum estimate of the total numbers of persons required, by MOS and skill level.

Analysis of each functional performance requirement in terms of special physical and mental requirements should make all possible use of historical data. When these characteristics pertain to functions or materiel subsystems not comparable to anything that exists, then the estimates of characteristics will be less firm but a "best estimate" should be provided. When this estimate relates to what appears to be a critical function, it should be noted as a critical issue for study.

During Event A2, the future availability of various types of persons is considered. These considerations should be refined on the basis of A4 activities. Any initial estimates of MOS, skill level, and numbers of personnel requirements developed as part of A2 should be updated on the basis of data and estimates provided by MILPERCEN. They should be reviewed with ADMINCEN. The major goal of this endeavor is to identify potential shortfalls. From this information requirements for developing human resources can be estimated. Essentially this involves developing an outline of a plan for obtaining persons through such means as recruiting, diverting them from other systems, or training. The impact of diverting persons from other systems should be estimated. In particular, an estimate should be made of the impact of supporting a new system while a replaced system is being phased out.

The foregoing considerations may have an impact on training requirements and plans as outlined during Event A3. Before the A3 plans are incorporated into the LOA they should be reviewed to assure that they are compatible with any special resource development requirements identified during Event A4.

Throughout this event consideration should be given to any skill, training, and/or personnel limitations or constraints imposed by the MENS or by the Project Manager. Issues that cannot be resolved should be identified as issues for further study. In particular, the potential non-availability of persons with suitable characteristics in required numbers should be noted.

INPUT DATA/EVENT DATA BASE

a. Same as for Event A3 (page III-10), plus any relevant information generated during Event A3.

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b. Estimates of availability of various types of persons in future time frame.

Descriptions: Recruitment plans; estimated manpower pool for future dates.

Data Source: MILPERCEN

When Available: Continually available.

Access Procedures: Request through TASSO, TRADOC Systems Support Office.

c. Information about competing requests for manpower

Description: Description of competing requirements for MOS and skill level personnel.

Data Source: Proponent school for required MOS.

When Available: Continually updated.

Access Procedures: Request through proponent school for MOSs of interest.

OUTPUTS AND END PRODUCTS

a. Description: A document which describes (1) personnel requirements by MOS and skill level, (2) numbers of personnel required, (3) any special mental, physical, or attitudinal requirements; (4) concept for obtaining required human resources, and (5) problems in need of further study.

b. Output Usage: Provides input to LOA and is attached as an annex to LOA.

c. Availability Requirements: By time LOA preparation begins.

REFERENCES

Same as listed for Event A2 (page III-2).

4. EVENT A5--LETTER OF AGREEMENT (LOA)

OVERVIEW

Purpose. The Letter of Agreement (LOA) documents the agreement between TRADOC and DARCOM as to the nature and characteristics of the proposed system and the investigation(s) needed to develop and validate the system support concept; to define the associated operational, technical, and logistical support concepts; and to promote synchronous interaction between the combat developer and the materiel developer (AR 71-9). The LOA describes the specific investigations which the combat developer, materiel developer, logistician, trainer, and administrator must accomplish to develop the proposed system and validate estimates of personnel and training requirements.

Relation to LCSMM/IPS Events. The LOA is based on information developed during the Materiel Concept Investigation (Event A1 in the IPS model) conducted by the materiel developer and on investigations of personnel and training requirements (Events A2, A3, and A4) conducted by the training developer. All subsequent actions in the LCSMM deal with the validation or revision of concepts contained in the LOA.

TSM/POC Responsibilities. The TRADOC proponent, in cooperation with a TSM/POC (if appointed) and/or a Joint Working Group (TRADOC/ Materiel Developer), prepares the personnel support portions of the LOA. These responsibilities, and the order of events during preparation of the LOA, are described in Chapter 3 of AR 71-9.

Phasing. This event should occur immediately upon completion of Events A1 and A4. Approval of the LOA is required before subsequent LCSMM/IPS events can begin.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A5

The LOA contains a summary of the concepts, plans, and problem areas identified during all preceding Phase I events. The training developer is responsible for preparing inputs to paragraph 4 of the LOA, Prospective Operational Effectiveness and Cost, and paragraph 5, System Development. During events A2 through A4, the training developer should have prepared the required information in Annex form for inclusion in the LOA and for summarization in the appropriate paragraphs. The LOA format and procedures for its preparation are described in AR 71-9. The format instructions for the LOA as well as an example are reproduced at the end of this section.

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INPUT DATA/DATA BASE

a. Training and Personnel Support Concept

    Description: Brief outline of proposed training system including
    training developments required, and the training management
    and administration system.

    Data Source: Outputs of Events A2, A3 and A4.

    When Available: Must be available by the time LOA prepara-
    tion begins.

    Access Procedures: Request from TRADOC system proponent.

b. Issues and Recommendations for Further Study

    Description: A brief statement of critical training and
    personnel support issues that must be resolved, to include
    suggested studies needed for their resolution.

    Data Source: Outputs of Events A2, A3, and A4.

    When Available: Must be available by the time LOA prepara-
    tion begins.

    Access Procedure: Request from TRADOC system proponent.

c. Estimate of Training Development Costs

    Description: A gross estimate of the cost of the proposed
    training system. Probably will consist only of a com-
    parative estimate--whether proposed system will cost less,
    the same, or more than the system it will replace. Unique
    costs should be highlighted.

    Data Source: Output of Events A2, A3, and A4.

    When Available: By the time LOA preparation begins

    Access Procedure: Obtain from TRADOC system proponent.

d. Estimated Schedule for Training Development

    Description: A brief outline of the time required to develop
    key features of the training system, such as training devi-
    ces, training material, handbooks, key personnel training
    program, and so on.

Data Source: From output of Event A3.

When Available: Prior to preparation of LOA.

Access Procedure: Request from TRADOC system proponent.

OUTPUTS AND END PRODUCTS

a. Description: The output of Event A5 is the LOA, the requirements document, that, if approved, serves as the basis for committing 6.3A funds to further development of the proposed system.

b. Output Usage: The LOA guides subsequent investigations during Phase I of the LCSMM. In particular, the LOA outlines the direction of further development of an Individual and Collective Training Plan (Event A7.1), and the preparation of a more detailed Training Support Plan (Event A7). These and other events during Phase I of the LCSMM are directed toward the validation of concepts contained in the LOA. The results of these validation studies are used to update these concepts. The updated versions are described in an Outline Acquisition Plan (Event A10).

c. Availability Requirement. The schedule for completion of the LOA will be determined by the system PM.

REFERENCES

AR 71-9, Materiel Objectives and Requirements, 15 November 1977 (Appendix D, "Format for Letter of Agreement")
TRADOC Circular 70-1, Training Device Development, 28 February 1979 (Appendix B, "Training Device Letter of Agreement (TDLOA)")
OTEA, Operational Test and Evaluation Methodology Guide, May 1976 (Example 3.1, "Letter of Agreement").
ARI TR-78-A7, TSM Guide to Training Development and Acquisition for Major Systems, March 1978 (Section 4.3 "Letter of Agreement")

EXAMPLES AND ILLUSTRATIONS

a. The LOA format description, from AR 71-9, is shown in Example III-1.

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FORMAT FOR LETTER OF AGREEMENT (LOA)

LOA submitted to DCSOPS will be in the format provided below. Information indicated in that format should be provided to the extent such information is available. The LOA should contain the minimum information necessary to adequately describe the system.

1. NEED.

   a. A brief description of the threat, in terms of the collection capabilities of the enemy to locate and target the proposed system; then the enemy destructive capabilities to exploit this information. Current systems used to counter the threat, the systems to be replaced and the timeframe for which the new capability is needed will then be enumerated. Detailed Threat Annex will be attached as Annex C.

   b. Catalog of Approved Requirement Documents (CARDS) reference number: (To be assigned by DA ODCSOPS).

2. OPERATIONAL CONCEPT.

   a. A description of the role of the system on the battlefield and its relationship to other systems, multilateral developments and emerging US tactics.

   b. The mission profile will be attached as Annex A.

3. SYSTEM DESCRIPTION.

   a. A statement indicating the principal characteristics expected to be included in the system to include how the system will defeat the threat, what counter-countermeasures will be considered, what the system looks like and those technological alternatives that have a reasonable chance of developmental success. Included, if applicable, must be requirements and provisions (to include communications) for interoperability; continuity of operations (CONOPS); security; reliability, availability, and maintainability (RAM), standardization to include commonality for hardware and software to which the system will adhere; nuclear survivability; collective protection equipment; adverse weather/reduced visibility conditions (full ECM, smoke/obscurants, aerosols, rain, fog, haze, dust, etc.).

Figure III-1. Format for Letter of Agreement (LOA)

b. A discussion of other service, NATO/ABCA, or other allied nation interest in the Army development/procurement. Include data on other service or allied developments with a view toward establishing potential for standardization/interoperability, or co-production. Include data on potential for procurement of allied nation items/systems.

4. PROSPECTIVE OPERATIONAL EFFECTIVENESS AND COST. A realistic quantitative estimate of the operational effectiveness we will gain from the new alternatives when compared with the system to be replaced. This paragraph should include a sub-paragraph which identifies the estimated cost of the new capability. It should also include a subparagraph which identifies the estimated additional manpower requirements or manpower savings of the new capability on a per system, using unit, and total Army basis.

5. SYSTEM DEVELOPMENT. This paragraph is divided into operational, technical, logistical, training and manpower sub-paragraphs. Each sub-paragraph describes the system unique events which the combat developer, materiel developer, logistician, trainer and administrator must undertake to produce the total system. Include manpower constraints related to mission area or force level. Include commitment to assess alternatives to reduce manpower requirements or increase productivity.

6. SCHEDULES AND MILESTONES. A listing of the significant events and their times, which will be conducted as a result of the particular LOA.

7. FUNDING. A broad estimate of the Advanced Development (AD), Engineering Development (ED) and Unit Flyaway Costs. The AD and ED costs will be broken down by fiscal year and expressed in constant dollars. This paragraph will also identify the number of prototypes which will be fabricated.

ANNEX A - Operational Mode Summary/Mission Profile - A list of tasks and conditions in terms of frequency and urgency visualized for system employment in military operations. The Mission Profile is logically derived from the Operational Concept and provides the starting point for developing the system characteristics.

ANNEX B - Coordination Annex - List all commands, other services allied nations and activities with whom the LOA was coordinated and provide full rationale for nonacceptance of comments, if any.

Figure III-1 (Continued)

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ANNEX C - Threat Annex - A detailed threat package to include coverage of the total threat the proposed system is expected to face on the battlefield over its life cycle, to include those threat systems it is designed to counter as well as those threat systems which counter or degrade the proposed system will be specified. This Annex will be classified as required and withdrawn and handled as a separate document to facilitate transmittal, as required.

ANNEX D - Rationale Annex - Supports various characteristics stated in the LOA.

ANNEX E - RAM Annex - Supports the stated RAM characteristics.

NOTE: Only Annexes A&B are required to be forwarded to HQDA.

Figure III (Continued)

b.   An illustration of an LOA, is reproduced following the LOA
     format illustration, as shown in Annex A (TBD).

5.   EVENT A6--TASK LISTING

OVERVIEW

Purpose. The purpose of the task listing event is to determine
how a function will be performed--by machine, by humans, or by an
interaction of humans and machines (shared function). This process is
known as "Function Allocation." One of the primary purposes of this
activity is to influence equipment design.

Relationship to LCSMM/IPS Events. Event A6 receives inputs from
Event A3 (preliminary task and skill analysis) and the system descrip-
tion and mission profile prepared for the LOA (Event A5). The list of
critical tasks identified during Event A6 provides the basis for sub-
sequent personnel studies (Event A11) and for the development of the
Outline Individual and Collective Training Plan (Event A7.1). During
Operational Test I (Event B6) training procedures for providing a
capability to handle "critical tasks" performed by humans are eva-
luated. Although this action is not shown in the Phase I chart, the
outputs from Event A6 should be used to update/refine the outputs from
Events A2, A3, and A4.

TSM/POC Responsibilities. The "function allocation" portion of
this activity is performed by the materiel developer--by engineers and
by human factors personnel. The materiel developer will determine
the system functions to be performed by humans and will identify
mission-critical tasks. The training developer is responsible for
identifying those tasks that have a high training risk and that are
critical to mission accomplishment.

Phasing. This event may begin immediately after Events A3 and
A4 are completed. It continues as long as different materiel concepts
continue to be considered. For each materiel concept or major hard-
ware variation, a separate data package will be prepared covering
task listings, function allocations, and critical tasks.

GENERAL PROCEDURES FOR ACCOMPLISHING A6

When designing new equipment, engineers often make tacit assump-
tions about the capability of humans and, when left to their own
devices, will allocate functions to humans and to machines on the
basis of experience and intuition. At the very least these allocations

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should be verified by human factors personnel. As a corollary, function allocation should be performed in close cooperation with design engineers. This will increase the probability that human factors considerations will have an impact on equipment design.

Function allocation is followed by the preparation of task listings for each function allocated in whole or in part to humans. The training developer then analyzes these tasks for criticality--either in terms of mission accomplishment or in terms of difficulty of obtaining desired human performance--and divides them into "critical" and "non-critical" tasks. Development of training plans and materials for critical, "high risk" training tasks is emphasized until Operational Test (OT) I is completed. Subsequently, training materials and devices are developed for all tasks selected for training.

A three-step process is employed in Event A6. First, major functions or tasks that must be performed for mission accomplishment are identified. Then, these functions are allocated according to whether they will be performed by humans, machines, or an interaction of humans and machines. Those functions allocated to humans then are analyzed to identify tasks that are critical for mission accomplishment and that are "high risk" training tasks. The procedures for accomplishing these steps have not been fully developed. What follows is based on a description provided by Meister (1971).

Function Identification. This activity begins with a review of the task listing developed during Event A3 and is based on the equipment concept developed at that time. If the concept has been revised/refined, the task listing should be revised according to procedures described for Event A3. The resulting task listing will be quite general and in essence is a description of functions that must be performed for mission accomplishment.

The mission profile for the system should be carefully examined, and each system mission identified. To accomplish this, obtain and examine available documents describing the system. To the extent possible, develop the following information items: (a) system's mission(s) or goal(s); (b) system inputs and outputs; (c) system capabilities and performance requirements demanded by the mission; (d) environmental factors that may affect system performance; and (e) system constraints.

In a next step the analyst works from system performance goals to identify required functions. For each system mission, list sequentially the individual major operations that must be performed to implement the mission. This list of operations in effect becomes the functions that must be accomplished for each system mission. This list also becomes the task listing for Event A6 (see Phase I chart).

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For each system mission the required operations or functions shoud be displayed in the form of a Functional Flow Diagram (FFD). As an illustration, the mission of "intercept enemy aircraft" can be analyzed into such functions as: detect presence of aircraft, identify aircraft, conduct threat analysis of aircraft, decide whether aircraft should be a target, select means of firing on aircraft, and so on. Figure III-1 shows an FFD for accomplishment of this "intercept aircraft" mission.

Detect → Identify → Threat Analysis → Decision to Acquire →

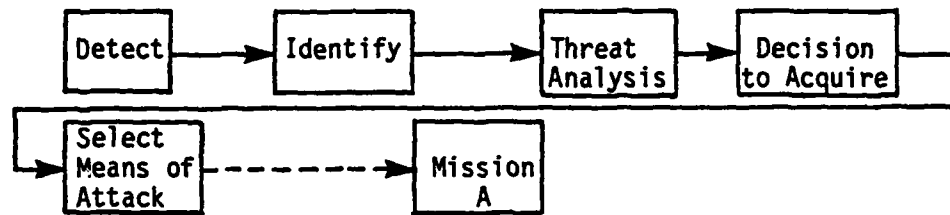→ Select Means of Attack - - - - → Mission A

Figure III-1.   Illustrative Functional Flow Diagram
for Aircraft Intercept Mission

The initial version of a functional flow diagram is expanded by analyzing already identified functions to determine required inputs and outputs. Usually this analysis will identify additional functions which should be shown on the FFD. In Figure III-1, for example, it probably would be determined that the function of "analyze threat" should be initiated by the report of an unidentified aircraft. Thus, an additional function, "report unidentified aircraft," should be inserted in the FFD as shown in Figure III-2.
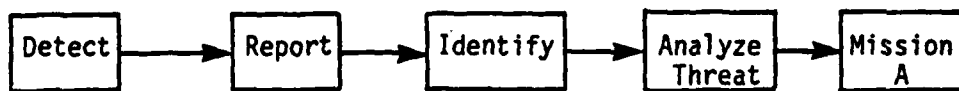
Detect → Report → Identify → Analyze Threat → Mission A

Figure III-2.   First Expansion of FFD for Aircraft
Intercept Mission

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The inputs to and outputs from each system function should be described in as much detail as possible. Also, environment factors, performance requirements, and constraints that might affect on system functions or function inputs and outputs should be described. It should be noted that descriptions of inputs and outputs should be in terms of functional requirements and should not imply the mechanism by which the inputs and outputs are produced.

Obviously, the foregoing analysis often must be based on incomplete data. Historical data from comparable systems or sub-systems should be used when available. In many instances the professional judgment of subject matter experts must be employed. It is likely that the analysis will identify gaps where further analysis must await the refinement of the system concept.

Function Allocation. As a next step, a decision should be made as to those functions best performed by humans. Gross criteria for accomplishing this have been developed and have been cited in many human factors textbooks. Meister suggests that three different function allocation schemes be developed. The first is based on the assumption that system functions will be implemented largely by hardware (automatic configuration). The second assumes that operator personnel will be primarily responsible for implementing system functions (manual configuration). The third assumes a man-machine mix (shared functions). Each of the alternatives should be displayed in the form of a Functional Flow Diagram.

What should follow next is a series of informal trade-off studies. For each alternative the functions are examined to verify (estimate) that the equipment and the operator can perform their respective functions in accordance with system requirements. Admittedly this is an exercise in professional judgment; it is best performed by system designers and human factors personnel in collaboration. Those alternatives that meet the criteria then are briefly examined to determine whether their probable costs are within an acceptable range.

From the human factors standpoint, the process just described is of special importance if the goal is to influence system design. Before and just after the LOA (Event A5), many alternative system configurations may be considered in rapid succession. A human resources specialist should be part of the team considering the alternatives. This specialist should be responsible for:

o   Identifying and/or verifying operator requirements.
o   Verifying that operator requirements can be performed satisfactorily (do not create excessive demands on operator(s)).

o   Examining of man-machine function allocation scheme(s) to:
     -    Identify human factors implications of design
          alternatives.
     -    Develop different allocation schemes, if these are
          judged to be a requirement.

During the examination of alternative system configurations the
human factors specialist should be willing to rapidly perform function
allocation exercises, seeking the aid of design engineers, and to
offer an informed opinion about the advisability of assigning various
functions to humans. This seldom happens. At present the procedures
for accomplishing the responsibilities listed above and the data base
for making such judgments are minimal; the decision maker is forced to
rely on professional judgment and experience.

Critical and High Risk Tasks. In allocating the list of functions
that must be accomplished to satisfy system objectives, the developers
will have assigned certain functions to be performed solely or in part
by humans. These human-performed functions should be examined to
identify (a) functions (tasks) critical to mission accomplishment; and
(b) "high risk" training tasks.

Mission-critical tasks are those that must be performed accura-
tely and in a timely manner, to prevent failure or serious degradation
of the mission. The materiel developer should make these determina-
tions.

High training risk tasks are those requiring skills that are dif-
ficult to acquire through training. Criteria that may be used to iden-
tify such tasks include (a) level of skill or knowledge required for
proficient performance, (b) complexity (number of skills and amount of
knowledge required), and (c) training "distance" (difference between
entry skills/knowledge and levels required for proficient
performance). Additional criteria are stated in TRADOC Pamphlet 350-
30 under the discussion of Block I-2.

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The foregoing analysis should result in a Mission Critical/
Training Risk Matrix similar to the examples in Figure III-3.

TRAINING RISK

	High	Medium	Low
High	A2, A3, C1	E1	C2, C3
Medium	B1	A1, E2	
Low	B2	D3	D1, D2

Figure III-3. Mission Critical/Training Risk Task Matrix
              Showing Allocation of Tasks for Accomplishment
              of Mission A, System AXZ

Critical, high-risk tasks may be the subject of further investi-
gation (Event A11) to determine how best to acquire the desired per-
formance capability. Also, such tasks will be emphasized during
subsequent training activities leading to OT I.

INPUT DATA/EVENT DATA BASE

a.   A list of tasks or system functions that must be accomplished.
     Based on the functional analysis conducted during Event A2.

b.   A mission profile.

OUTPUTS AND END PRODUCTS

a.   Description:

     (1) A series of Mission Critical/Training Risk Task Matrices.
     (2) A list of mission functions together with a recommen-
          dation concerning how each should be accomplished
          (equipment, humans, or shared function).
     (3) Functional Flow Diagrams showing major alternative
          approaches for meeting mission requirements.

b. <u>Output Usage</u>

(1) The Mission Critical/Training Risk Matrix will be used:

    (a) During Event A7.1 to identify the tasks on which to concentrate during development of the training plan.

    (b) As background data for deciding the need for certain personnel studies dealing with training (Event A11).

(2) The list of mission functions and allocation recommendations can be used to suggest the need for changes in system design. This information should be supplied to the materiel developer.

(3) The Functional Flow Diagrams can serve to instigate studies of alternative ways to meet mission goals, especially if it is judged that functions allocated to humans cannot be performed adequately.

REFERENCES

TRADOC Pamphlet 350-30 Interservice Procedures for Instructional Systems Development: Executive Summary and Model, 1 August 1975

ARI-TR-78-A7, <u>TSM Guide to Training Development and Acquisition of Major Systems</u>

ARI-TR-426, <u>An Annotated Bibliography for Instructional Systems Development</u>

Fitts, P.M., et al. (Eds.), <u>Human Engineering for an Effective Air Transportation and Traffic Control System.</u>

Meister, David, <u>Human Factors: Theory and Practice</u>

EXAMPLE AND ILLUSTRATIONS

a. Example of Functional Flow Diagram, Figure III-1.
b. Example of Expanded Functional Flow Diagram, Figure III-2.
c. Example of Mission Critical/Training Risk Task Matrix, Figure III-3.

6. EVENT A7.1--OUTLINE INDIVIDUAL AND COLLECTIVE TRAINING PLAN (OICTP)

    OVERVIEW

    Purpose. The Outline Individual and Collective Training Plan
    (OICTP) provides:

    o   Detailed planning and baseline specifications for use
        by those organizations and activities primarily concerned
        with the development and implementation of a training
        program for a new system.

    o   A reference document for those activities that may interface
        with or impact on training system development.

The OICTP describes a training concept in terms of who is to be
trained; the skills that have to be taught; when, where, and how the
training will be accomplished; and constraints on training require-
ments and resources imposed by design of the materiel system or by DA
or DOD planning agencies. The OICTP concentrates on high-risk
training tasks and mission-critical tasks as identified during Event
A6.

    Relationship to LCSMM/IPS Events. Training requirements were
identified and general training concepts formulated during Event A3,
Training Requirements. Outputs from this event should be available
before preparation of the OICTP begins. Also, the OICTP makes exten-
sive use of the outputs from Event A6, Task Listing, which identifies
the mission-critical/high-risk training tasks that are emphasized
during OICTP preparation. The outputs from Event A7.1 provide the
basis for preparing the Training Support Plan (Event A7). Also, the
outputs are required by many subsequent training system development
events.

    TSM/POC Responsibilties. TRADOC proponent schools and activities
are responsible for developing the OICTP and the ICTP that eventually
follows. Other responsibilities of the system proponent, as well as
those for other TRADOC activities, are outlined in TRADOC Circular
351-8. The OICTP should be prepared in close cooperation with the
materiel developer, logistics activities, and ADMINCEN.

    Phasing. TRADOC Circular 351-8 states that the OICTP "will be
submitted to HQ TRADOC at the same time as the Letter of Agreement
(LOA)."

    Preparation of an OICTP is an iterative process. It begins with
the identification of training requirements in Event A3. The training
concept and general plans developed during Event A3 are further
refined following the identification of high-risk tasks (Event A6).

The OICTP must be continually updated throughout the Conceptual Phase to reflect the most recent revisions to the materiel concept and the findings of any special training studies conducted to identify a best training approach. If two or more training concepts are evaluated during the CTEA (Event A9), the OICTP for the accepted training approach may need revision to handle problems uncovered during the CTEA.

The formal completion date for Event A7.1 depends on the preparation schedule for the Concept Formulation Packet (Event A9). The outputs from Event A7.1 are necessary for the conduct of a CTEA/COEA, activities that occur during preparation of the CFP.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A7.1

Policy and procedures covering preparation of an Individual and Collective Training Plan (ICTP) are described in TRADOC Circular 351-8, which also discusses preparation of an Outline OICTP. OICTP preparation is based on data developed during the front-end analysis (FEA) of individual and collective tasks performed by operator and maintenance personnel. General procedures for such an analysis have been already been discussed under Events A2 and A3. These data are updated later as part of the Advanced Development Contract (Event B1).

Work on an OICTP should begin with an updating of all training-related information already developed. This includes (a) training requirements information from Event A3; (b) any estimates of skill and knowledge requisites from Event A4; (c) a description of the types of people, by MOS and skill level, required to operate and maintain the materiel system (this is derived from the Mission Profile); and (d) the list of high-risk training/mission-critical tasks from Event A6.

The initial draft of the OICTP should concentrate only on those high-risk training/mission-critical tasks from Event A6. If time permits, the remaining tasks in this matrix can be analyzed as described below. The goal of this analysis is to prepare five different types of plans--Individual Training Plans, Collective Training Plans, an Institution Training Plan, a Unit Training Plan, and a Training Extension Course (TEC) Plan.

The OICTP must provide a plan for training persons in various duty positions. Thus, the first step in developing the OICTP is to allocate each high- and medium-risk training task to one of the proposed duty positions for the new system. Then, for one duty position at a time, information related to the questions listed below should be developed.

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The following questions were derived from a study of the instructions as to information that should be contained in an ICTP (see TRADOC Circular 351-8). The list is not exhaustive, and some of the questions may not be answerable during the conceptual stage of the LCSMM. However, all should be addressed, if only to indicate that data must be developed to answer them later on. The questions are as follows:

a. Is this task performed by an individual or as part of a team? The answer to determines whether the task becomes part of the individual or the collective training plan.

b. What are acceptable instructional settings and which is the preferred? Guidance for making such judgments is provided by ISD manuals and various technical reports (see Reference Section). Acceptable as well as preferred settings should be identified so that clusters of tasks can be formed on the basis of instructional settings.

c. Will a training device be required? At this stage in the LCSMM, emphasis should be placed on identifying training device requirements since many are expensive items with a long lead-time. Identification of other types of training media can be considered later, during preparation of the ICTP. Criteria for identifying training device requirements are not well developed, but useful guidance can be found in TRADOC Pamphlet 350-30 (under Block III.2, Media Selection) and in TAEG Report No. 16.

d. Will skill performance aids (SPAs) be required? For most new systems SPA material for maintenance personnel will be required and must be identified in system development RFPs. In addition, the use of SPAs should reduce the need for training on certain maintenance tasks.

e. Where and how will training be assessed? Training can be assessed during formal training, as part of the Skill Qualification Test (SQT) program, or during an Army Training and Evaluation Program (ARTEP). Team skills should be assessed during an ARTEP, and individual skills via SQTs. Selection of either of these methods initiates a long series of events. For example, a decision to assess using the SQT program means that new or revised Soldier's and Commander's Manuals must be prepared, but not before Operational Test I has been completed.

f. Where and how will training be validated? During the LCSMM a variety of training material must be developed and validated.

Separate small and large group trials can be used for valida-
tion, or it can occur during, or following, OT I. If at all
possible, training material related to high-risk training
tasks should be validated before or during OT I.

g.   What are the performance standards for each task? At this
stage detailed performance objectives cannot be written,
but performance requirements can be estimated for each cri-
tical task by using the same criteria used to identify
high-risk training tasks. For example, a certain main-
tenance task may have been identified as mission-critical
and/or high training risk tasks because it must be
accomplished within five minutes. "Successful comple-
tion within five minutes" can be listed as the minimum
performance standard for that task. For a guide to develop-
ing critical performance, standards see reference letter,
ATTSC-DC-DPA, 6 February 1979, Subject: Standard Training
Paragraphs for Requirements Documents and Operational Test
Training Issues.

h.   What are the preferred modes or methods of learning? Within
each instructional setting more than one mode of learning
may. be acceptable. In addition to lecture and self-
instruction modes, one might recommend CAI/embedded training,
peer instruction, formal OJT, or field exercises.

Guidance for answering the questions can be found in ISD
manuals and other documents as noted in the Reference Section
for this event. Most of this information will be developed by the
proponent school personnel, with assistance as required from the
materiel developer and possibly from ADMINCEN.

The output of the foregoing activities should be a series of
tables, one for each identified duty position. For each task listed
in the left column of the table, the information pertaining to the
above questions should be displayed.

The next step in Event A7.1 is to reorganize the tables just
described into five new tables arranged in terms of individual train-
ing, collective training, institution training, unit training, and TEC
training. Each of these tables should be subdivided by duty position.
When this has been done, it should be possible from these tables to
determine, for any duty position, the tasks that can effectively be
taught in each instructional setting.

It is probable that certain training programs exist that, if
revised, would accommodate the training requirements for the new
system. This prospect should· be examined thoroughly.

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As a final step in the preparation of an OICTP, information contained in the various tables should be summarized, and a summary statement developed for each of the following topics (taken from Appendix D, TRADOC Circular 351-8):

a. Role of skill performance aids (SPAs)
b. Role of institutional training courses
c. Use of Army correspondence course program
d. Need to revise or develop new Army training literature
e. Need to revise or develop new Soldier's/Commander's Manuals
f. Role of SQT and ARTEP for performance assessment
g. Role of Training Extension Course (TEC)
h. Training device requirements

An OICTP must be developed for each major system alternative. In addition, a separate OICTP should be developed for each training concept if more than one is under consideration. For example, two alternative ways to obtain operator personnel might be transition training of persons initially trained on a similar system and initial training of new recruits. To assess the cost-effectiveness of these alternatives, an OICTP and a training support plan should be prepared for each alternative and a CTEA performed.

INPUT DATA/EVENT DATA BASE

a. A general training concept as developed during Event A3 and summarized in the LOA.
b. A general outline of a training plan as developed during Event A3.
c. Any constraints on training as expressed in the LOA.
d. Estimates of mental, physical, or attitudinal requirements or requisites as developed during Event A4.
e. All outputs from Event A6.

OUTPUTS AND END PRODUCTS

a. Description

(1) An outline, accompanied by a summary description of:

(a) An Individual Training Plan
(b) A Collective Training Plan
(c) An Institutional Training Plan
(d) A Unit Training Plan
(e) A Training Extension Course Plan (TEC)

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(2) Summary descriptions plus plan outline covering the need, development, revision, and use of:

(a) Skill Performance Aids
(b) Army training literature
(c) Soldier's and Commander's Manuals
(d) SQTs and ARTEPs
(e) Training devices

(3) A set of tables listing, for each planned-for duty position, the tasks assigned plus a descriptive listing of the judgments made as to how to train for each task.

b. Output Usage

(1) All outputs are used during Event A7 to develop a Training Support Plan.

(2) Identified requirements for SPAs and other training material, especially training devices, should be incorporated into the AD prototype contract (Event B1).

(3) Requirements for contractor-developed training material, to include validation of the material, should be incorporated into the AD prototype contract.

(4) Plans to assess training via SQTs and/or ARTEPs should be forwarded (during Phase II) to the persons responsible for those tests/exercises.

(5) Persons responsible for CTEA/COEA conduct will use most or all of the information developed.

REFERENCES

AR 71-5   Introduction of New or Modified Systems/Equipment
             (to be replaced by AR 350-XXX).
TRADOC Circular 70-1, Training Device Development
TRADOC Circular 350-3, Individual/Collective Training and
             Development Glossary (TBP)
TRADOC Circular 351-3, Individual Training Plan (TBP)
TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRADOC Circular 351-5, SQT Policy and Procedures

APPENDIX C

CONTENTS OF INDIVIDUAL AND COLLECTIVE TRAINING PLAN (1CTP)

C-1. References. Cite governing regulations and directives.

C-2. General.

    a. Purpose. State the overall purpose of the ICTP.

    b. Scope. Should briefly address institutional and unit training
programs and location, NET requirements, effects of any changes to system/
equipment under development, input of contents to the Individual Training
Plans (ITP) for affected MOS, action to trigger AR 611-1 submission if
needed, separate actions required to implement the ICTP and state that
the ICTP is a management and planning document based on best data available
and subject to change.

    c. Development. Should briefly state the approach to training that
will be used in developing the training programs to support the system/
equipment and the areas which have been subjected to special emphasis.

    d. Revisions. State frequency of expected review and updates.

C-3. Description of equipment.

C-4. Training strategy. State the planned strategy by which the training
is to be implemented; cover both institution and unit environment and means
by which unit proficiency can be gained and maintained through training to
support development and user testing and after the new equipment is deployed.

C-5. Assumptions. May be omitted where specific guidance has been pro-
vided.

C-6. Training concept. State the concept of how the training program
for the equipment will be structured; i.e., operator/organizational level
training to be conducted at the unit level; DS/GS level maintenance in-
struction to be accomplished at institutional level as add-on to established
MOS course.

C-7. Details. Subparagraphs will detail specifics of logistics require-
ments, instructor personnel, facilities, and other support requirements
needed to implement training on a continuing basis. Resource estimates
should identify requirements at the key account level, and should be ex-
pressed in terms of one-time and recurring implications. Personnel should
be expressed in terms of officers, enlisted and civilians (man-years and
end-strength). Funds should be rounded to the nearest hundred dollars,
e.g., $8.1K, and programed for as far into the future as practical. A

Figure III-2. Format for ICTP

detailed explanation of the type of data required by DA is contained in AR 71-5, Introduction of New or Modified Systems/Equipment, and its replacement, AR 350-XXX, New Equipment Training and Introduction. Headings should be as follows:

a. Task and objective schedule.

b. New equipment training (NET) requirements to include type of instruction, estimated spaces, time frame required and TDY and travel costs. Should also include an estimate of New Equipment Training Team (NETT) requirements.

c. Institutional courses of instruction involved (new and/or add-on).

d. Correspondence courses of instruction involved (new and/or add-on).

e. Requirements for instructor and support personnel changes. Should reflect both military and civilian manpower requirements and cost projections for a 5-year period, by year.

f. Facilities requirements (new or add-on).

g. Training equipment requirements and proposed distribution plan.

h. New funding requirements (see para e above, cost projections required for a 5-year period, by year).

i. Ammunition requirements, broken out by training phase, individual, institution and unit.

j. Training aids and instructional media requirements to include type and time frame/date required.

k. Training literature requirements.

l. Training device requirements.

m. Other support requirements needed to implement training on a continuing basis (POI, admin/billeting, office supplies, repair parts, expendables, etc.)

n. Doctrinal, maintenance, training or other publications/media requiring revision based on introduction of this equipment/system (ARTEP, SQT, SM, job aids, etc.).

o. Opposing force (OPFOR) training requirements.

Figure III-2 (Continued)

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C-8. <u>Appendixes.</u> Appendixes, lettered and titled by content, should be included as appropriate to furnish data in support of the above and to provide schedules shown in appendix D.

C-9. <u>Submission.</u> Proponents will submit ICTP based on provisions of paragraphs 6h and i. A system that has no training impact does not require an ICTP, however, written relief from the requirement must be obtained from USATSC, ATTN: ATTSC-DS.

Figure III-2 (Continued)

TRADOC Circular 351-8, Individual and Collective Training Plan
for Developing Systems: Policies and
Procedures
TRADOC Circular 351-XXX, Collective Training Plan (TBP)
TRADOC Pamphlet 350-30, Interservice Procedure for Indus-
trial System Development
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition of
Major Systems
Reference Letter, ATTSC-DS-DPA, 6 February 1979, Subject:
Standard Training Paragraphs for Requirements
Documents and Operational Test Training Issues.
Braby, R., et al., A Technique for Choosing Cost-Effective
Instructional Delivery systems

EXAMPLES AND ILLUSTRATIONS

a. Format for an ICTP as shown in Appendix C, TRADOC Circular
351-8, is reproduced as Example III-2.

b. For an example of an OICTP (minus appendices) see Annex A (TBD).

7. EVENT A7--TRAINING SUPPORT PLAN (TSP)

OVERVIEW

Purpose. The Training Support Plan outlines the procedures and
schedule for the development and acquisition of training material and
devices, the personnel and facilities needed to implement the proposed
training plan, and any training support organizations required to
manage the training. The plan concentrates on high-risk training
tasks, especially those judged to require expensive and/or lengthy
training.

The training support plan, together with the CTEA/COEA performed
on the basis of the plan, provides the basis for judging whether a
cost-effective training program can be implemented for the materiel
system as currently designed. If a CTEA/COEA indicates that a cost-
effective program cannot be developed, then a series of trade-off stu-
dies must be performed. These studies can lead to the redesign of
either, or both, the materiel system and the general concept for
acquiring trained personnel. In particular, the function allocation
process described under Event A6 may be redone for the purpose of
assigning more functions to equipment.

Throughout the LCSMM for a developing system, the training sup-
port plan will be revised and modified as required.

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Relation to LCSMM/IPS Events. The training support plan should contain three types of information. One type of information outlines the technical approach to training. This approach is what is described in the OICTP, so Event A7.1 should be completed before Event A7 begins. The other two types of information deal respectively with "quantities" (number of trainees, training time, etc.) and management/administrative considerations (training staff, facility requirements, etc). Information related to quantities and management is needed/required so that a CTEA/COEA can be performed. Thus, Event A7 is a continuation of Event A7.1 and is a necessary prelude to Event A9.

TSM/POC Responsibilities. Proponent school is responsible for preparing estimates of personnel requirements. TSM/POC should ensure that these estimates are coordinated with ADMINCEN and MILPERCEN.

Phasing. Event A7 is a continuation of Event A7.1. It must be completed before Event A9 begins since its outputs provide the data for conducting the CTEA/COEA performed during Event A9.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A7

The output of A7.1 is an incomplete OICTP, which does not describe how training will be scheduled or phased, or what support is needed. This information is developed during Event A7. The final result of both events is a complete OICTP/ICTP as described in TRADOC Circular 351-8. In TRADOC Regulation 600-4, preparation of this "complete" OICTP/ICTP is discussed under Event A7, Training Support Planning.

Event A7 should be started by obtaining updated information about the estimated numbers and types of persons required to man the system. These estimates should include requirements for OT II and for the first five years of system operation. Preferably, these estimates will be displayed in the form of charts that show, for various points in the system cycle, the number of persons by MOS and skill level who must be fully qualified. This information can be developed in part by a study of the Mission Profile for the system. The data derived from that study should be reviewed with the materiel developer before further use. The following charts also show the estimated number of persons to be obtained from various instructional sources. Figure III-4 provides an example of one such chart.

As the next step, a series of "training phase" diagrams should be prepared, one for each MOS. The tables developed during Event A7.1 provide the data. Each diagram should show the training phases (institutional settings) through which persons holding a particular MOS will progress in order to develop and to maintain their skills.
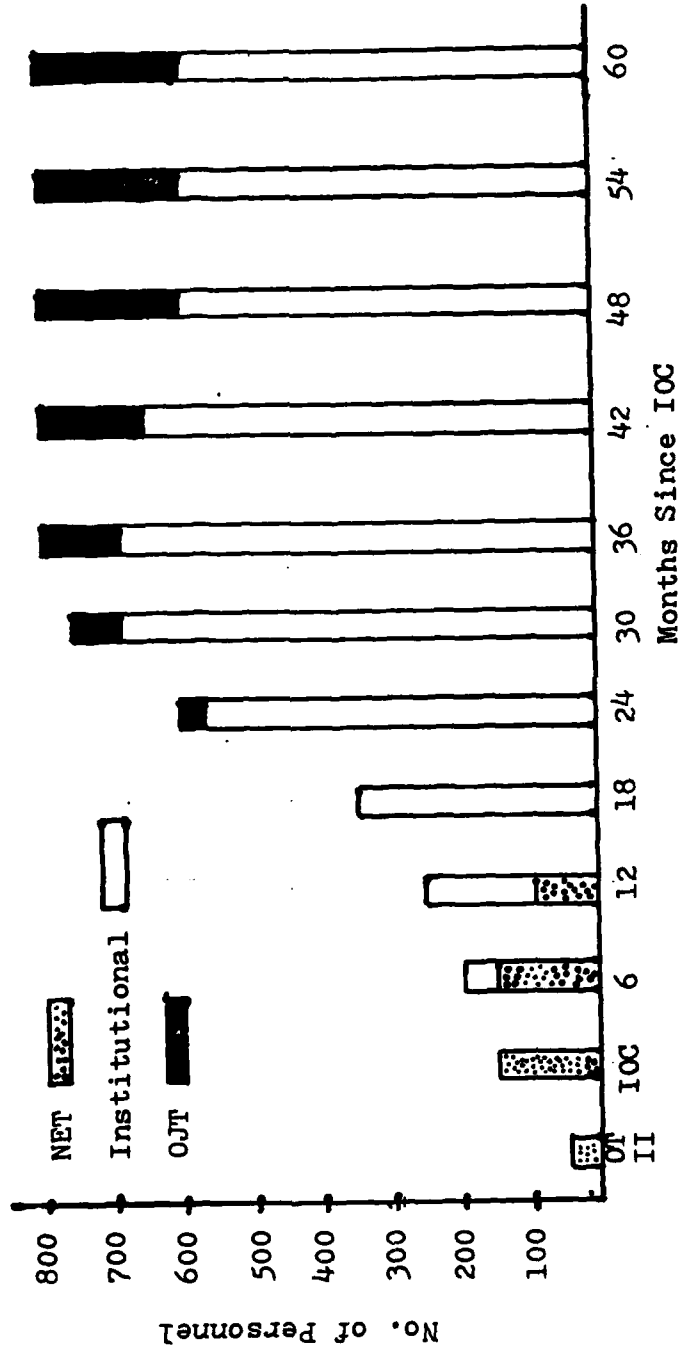
Figure III-4. Qualified Personnel Requirements for MOS XXX, Skill Level YY, and Source of Personnel

Each diagram should be subdivided to show the process of acquiring personnel via New Equipment Training (NET), Transition Training (cross-training from another system), and New Recruit Training. Figure III-5 is an example of a "Training Phase" diagram.

After these two steps one should have (a) a curve depicting the number of persons required at at any particular time, and (b) a series of training phase diagrams. The remainder of Event A7 is directed toward identifying how the training phase diagrams can be implemented so as to yield outputs that match the personnel requirement curves. The general procedures for accomplishing this are as follows:

a. For each MOS, estimate the contribution to be made by NET, transition training, and new recruit training. The following estimate for MOS XXX serves as an example:

    (1) NET--100% prior to OT II; 25% prior to IOC (Initial Operational Capability).

    (2) Transition Training--75% prior to IOC through first one-half year of system operation.

    (3) New Recruit Training--100% following first one-half year of system operation.

b. On the basis of the above decisions, calculate number of persons who must be trained via NET, Transition Training, and New Recruit Training.

c. For each of the three types of training, identify the institutional and instructional settings. For example, for transition training the institutional setting might be School A and the instructional setting might be unit training supplemented by self-instruction.

d. Analyze each of the following institutional/instructional training phases and estimate the following:

    (1) Staff requirements
    (2) Facility requirements
    (3) Special management requirements
    (4) Supplies and materiel, especially POL.

e. Outline a plan for meeting each of these requirements. For each plan prepare rough cost estimates in terms of costs per fiscal year.

The plans and data developed during Event A7 should be combined with the series of training plans from A7.1 to produce a series that

MOS XY3

NET(Persons from Systems D,E)

OJT(Persons from Systems D,G)

New Recruit Tng

MOS XX2

NET(Persons from Systems A,BO)

OJT(Persons from Systems B,C)

New Recruit Tng

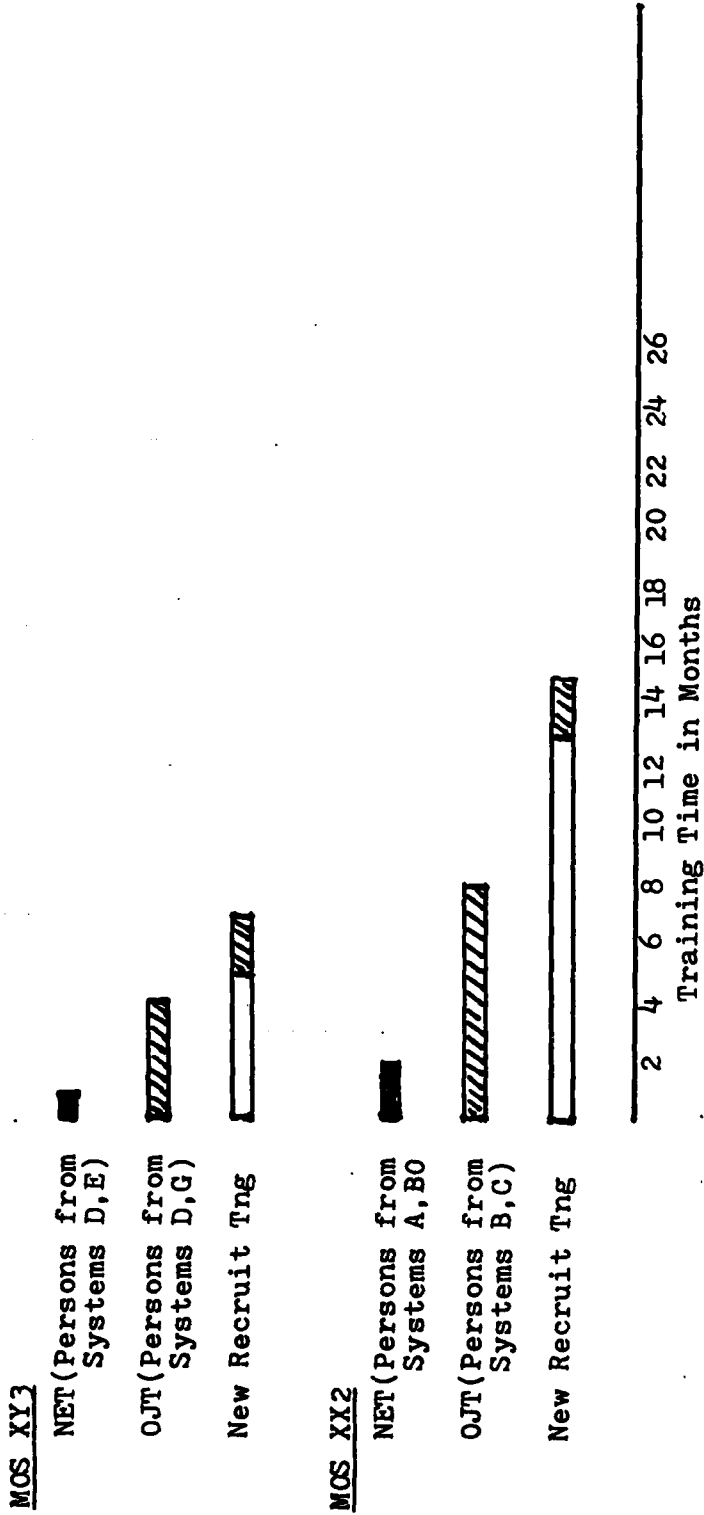2   4   6   8   10 12 14 16 18 20 22 24 26
Training Time in Months

Figure III-5. Training Phase Diagram for MOS XY3 and XX2

describes both training plans and the support required to implement those plans.

INPUT DATA/EVENT DATA BASE

a. All information/data developed during Event A7.1, preparation of OICTP.

b. Mission Profile and any other source of information about "quantities" of operator and maintenance personnel required to man the system.

c. Any information already developed as part of Event A8, especially recent decisions regarding types and numbers of persons to man the system, and training trade-offs, to include plans for recruitment, reassignment of persons to man the new systems, and plans for unit training.

OUTPUT AND END PRODUCTS

a. Description: A training support plan (TSP) that contains (1) training plans for individual, collective, institution, unit, and TEC training and (2) a description of the support requirements for each of the five plans. This description should cover the period from preparation for OT II through the first five years of system operation.

b. Output Usage: Provides the data needed to conduct a CTEA/COEA for Event A9. The training support plan also provides the training data that are incorporated into the Outline Acquisition Plan (Event A10) and identifies some of the requirements that must be addressed in the AD Prototype Contract (Event B1).

c. Output Availability: Must be available by the scheduled time for conducting the CTEA/COEA.

REFERENCES

TRADOC Regulation 71-12, Total Systems Management - TRADOC System Management (TSM)
TRADOC Circular 351-8, Individual and Collective Training Plan for Developing Systems; Policies and Procedures

TRADOC Pamphlet 350-30, Interservice Procedures for
Instructional System Development,
Volumes 1 and 2
DARCOM-TRADOC, Technical Documentation and Training
Acquisition Handbook
ARI-TR-78-A7   TSM Guide to Training Development and Acqui-
sition of Major Systems
Local (Proponent School) policy/SOPs for calculating instruction,
facility, etc. requirements

EXAMPLES AND ILLUSTRATIONS

a.   The format for a training support plan is contained in that
format designated for an Individual and Collective Training
Plan (ICTP). See TRADOC Circular 351-8 for that format.
b.   Sample of Qualified Personnel Requirements Chart, Figure III-4.
c.   Sample of Training Phase Diagram, Figure III-5.

8.   EVENT A8--ORGANIZATION AND OPERATIONAL CONCEPTS

OVERVIEW

Purpose. The purpose of this general category of activities is
to define--as precisely as possible and as soon as possible--the impact
the introduction of the new system will have on organizational equip-
ment, training, and personnel requirements, and to develop the organi-
zational and operational concepts to be used in the Concept Formulation
Package (CFP). To accomplish this the PM or development command must
identify any trade-offs that may be required and assist the proponent
in resolving the issues.

Relation to LCSMM/IPS Events. This event identifies the activi-
ties conducted by the proponent in response to and in support of the
evaluations necessary for preparing the CFP. They are the activities
required to provide input to the Trade-Off Determination (TOD), pro-
vide input to and conduct the Trade-Off Analysis (TOA), and conduct
the COEA and supporting CTEA. These major analyses are not listed in
the Phase I Chart, but their performance is assumed under Event A8 and
required for the CFP (Event A9).

TSM/POC Responsibilities. These activities require a coordinated
effort of the PM, the proponent, the logistic oriented school, LOGCEN,
and ADMINCEN. It is the PM's responsibility to identify the trade-
offs. It is the proponent who must develop the organizational and
operational concepts. This is normally accomplished by the combat
developer (TRADOC) with assistance from the agencies previously men-
tioned. On issues that cannot be immediately resolved, the PM is

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responsible for submitting them to Personnel Studies (Event A11) or other evaluations.

Phasing. All trade-offs must be resolved or submitted for further study before the TOA and COEA are conducted. It is apparent that evaluation of the issues must begin as soon as they are identified by the study of critical tasks (Event A6).

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A8

Since this event involves a series of actions, it is difficult to specify a general methodological approach. The basic premise is to describe the impact the introduction of the new system will have on the present force structure:

o   How will it change the organization?
o   How will it be used?
o   How many people will be required to operate, maintain, and
     support it, and what MOSs will they have?
o   What are the training requirements?

Determining the answer to such questions requires many separate and some coordinated evaluations. The coordinated evaluations are described under the CFP (Event A9)--the TOD, TOA, BTA, COEA, and CTEA. The separate efforts are less formal and not as well defined. They consist of such efforts as determining whether an operator can perform a critical task, can be trained to perform the task, or can be assisted in performing the task, or whether the task must be simplified by design changes. These are issues that the PM has designated as trade-off study issues.

These issues need some resolution as input to the TOA and COEA. Suppose, for instance, that the equipment requires an operator to handle 500 messages an hour and it is not known whether he can or cannot do this. The interim solution would be to provide two or more concepts for evaluation--one assuming he can meet the requirement and another adding an assistant operator. A request is then made for a personnel study to make the determination. The results are used in the next COEA.

Many of the issues are not that simple and resolution is only partial, even after data are gathered at OT I. The purpose of the studies is to define the issues as accurately as possible and to plan for the contingencies. If it is not known whether an operator can process 500 messages an hour or whether he can be trained to do so, the option of using the operators must remain open and be examined during tests.

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INPUT DATA/EVENT DATA BASE

The basic data needed for developing organizational and operational concepts are generally available within combat development activities, since most concepts are extensions of existing operations and organizations. The materiel effectiveness data and RAM data can be acquired through the PM from the contractor or developer and also from the proponent when available.

OUTPUTS AND END PRODUCTS

a. Operational Concept (OC). The OC describes the role of the system in force operations in combat and the interactions the new system will have with the rest of the organization.

b. Mission Profile (Revised). The revised mission profile is derived from the operational concept and consists of a list of operational tasks required of the unit, with frequency and urgency for each, as well as the conditions affecting the performance (e.g., visibility, terrain, possible countermeasures).

c. Other studies. A significant output of efforts to determine an organizational and operational concept will be the identification of issues needing resolution. Among them will be training issues, such as possible use of SPAs, costing of expendables (e.g., training ammunition, POL), or training device requirements. These issues will be designated for further study in accordance with AR 70-8, Personnel Performance and Training Programs.

REFERENCES

AR 70-8, Personnel Performance and Training Programs (PPTP)
AR 71-1, Army Combat Developments
AR 71-2, Basis of Issue Plans
AR 611-1, MOS Development and Implementation
TRADOC Pamphlet 11-8, Cost and Operational Effectiveness
Analysis

9. EVENT A9--CONCEPT FORMULATION PACKAGE (CFP)

OVERVIEW

Purpose. The Concept Formulation Package presents the results of the evaluative efforts performed to determine the Best Technical

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Approach(es) (BTA) to meet the stated objective of the MENS. It provides the necessary basic data for development of the Outline Acquisition Plan (OAP), whether it be for one approach or for several alternative approaches. It is a joint effort of the combat developer and materiel developer under the direction of the STF or SSG.

Relation to LCSMM/IPS Events. The CFP is based on numerous evaluative efforts. The number and size of these efforts will vary; but no matter how many studies are required of various materiel and personnel issues, all are directed toward four major inputs to the CFP.

Study	Responsibility
a. Trade-off Determination (TOD)	DARCOM
b. Trade-off Analysis (TOA)	TRADOC/DARCOM
c. Best Technical Approach (BTA)	STF/SSG
d. Cost and Operational Effectiveness (COEA)	TRADOC/CD

These events are conducted sequentially. However, since the data base is being continually revised because of the on-going materiel development, the individuals conducting these efforts should be in constant contact. This contact is generally coordinated through the TSM.

The IPS events pertinent to the preparation of the CFP are the Training Support Plan, Event A7, and the Organization and Operation Concepts, Event A8. Though these efforts do not directly become a part of the CFP, their inputs are critical to the COEA process. They must provide the best available estimates of the cost of training and the impact of that training on organizational structure and operations. This event corresponds directly with Event 8 of the LCSMM.

TSM/POC Responsibilities. The proponent school conducts the TOA, with assistance provided by ADMINCEN, LOGCEN, and/or the logistics oriented school as necessary. The combat developers at the proponent school conduct the COEA, with the supporting CTEA conducted by the training developer. The TSM should provide the coordination for these efforts, as well as assisting the PM in selecting the BTA.

Phasing. The evaluation of hardware design alternatives begins immediately after the LOA. Simultaneously, the training alternatives must be examined. This begins with the development of alternative

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approaches to training the critical tasks determined in Event A6, proceeds to the development of the OICP and the TSP, Event A7, and culminates in the performance of the CTEA in Event A9.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A9

The process leading to the preparation of a Concept Formulation Package is best characterized as a continuing evaluative effort of the hardware and personnel issues that lead to a comparison of the BTA with existing conditions. There are certain interim milestones where these continuing evaluative efforts must provide input to other evaluations.

Trade-off Determination (TOD). The TOD is conducted by the PM or development command and consists of an evaluation of the design alternatives and various support concepts associated with each. Its goal is to reduce the design/support alternatives to a minimum. During this activity the training developer should be in constant contact with the PM/development command, as any design additions or changes may affect the list of critical tasks developed during Event A6.

Trade-off Analysis (TOA) and Best Technical Approach (BTA). A TOA is conducted for the concepts remaining following completion of the TOD. The TRADOC proponent school conducts the TOA, with assistance provided by ADMINCEN, LOGCEN, and other agencies as required. The findings of the TOA are furnished to the PM or development command who then, in cooperation with the combat developer, determines a Best Technical Approach. The objective of the BTA is to determine the approach capable of providing highest combat performance.

There are numerous methodologies for TOAs, but most fall under the general categories of simulations and war games. Simulations generally provide the same results, expected values, when performed twice with the same data. On the other hand, war games, since they involve decision making processes, may not yield the same result from the same basic data. Therefore, when war games are used, conclusions should be based on several games, and expert interpretation of the decision making process should be included as part of the analysis. This expert interpretation determines whether increases or decreases in combat effectiveness were the result of a decision made during the war game or were caused by the system itself. The end result of this analysis is the BTA, determined jointly by the materiel developer and the combat developer at the STF/SSG level.

Cost and Operational Effectiveness Analysis (COEA). The COEA is performed by the combat developer, TRASANA, with assistance from the training developer provided in the form of a CTEA (discussed below).

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The basic methodology used for the COEA should be similar to that used for the TOA, with the output being the cost effectiveness of the system rather than just the combat effectiveness.

There may be more than one BTA, one for each competing system concept. Therefore, the cost effectiveness of each BTA versus a "baseline" system and/or current operational conditions must be displayed. The objective is to determine whether combat effectiveness can be increased by deploying the new system at either the same cost or at an allowable increased cost, or whether the same effectiveness can be achieved for a lower cost.

Cost data for major Army systems are obtained from the Office of the Comptroller of the Army, Directorate of Cost Analysis, under TRADOC Regulation 11-8.

Cost and Training Effectiveness Analysis (CTEA). The training developer's major contribution to the CFP is the training cost estimate input to the COEA. This is obtained by performing a CTEA using the information developed in the OICTP (Events A7.1 and A7.0, respectively). An OICTP should be developed for each BTA chosen, and the cost of implementing the plan determined and compared with present and projected baseline costs.

The methodologies for the performance of a CTEA are not yet as well defined as those for performing COEAs. Several efforts are under way at ARI and TRASANA to provide more sophisticated methodologies and to highlight previous problem areas by providing sample cases of previous efforts.

INPUT DATA/EVENT DATA BASE

a. OICTP - Event A7.1 Output
b. Critical Task Matrix - Event A6 Output

OUTPUTS AND END PRODUCTS

a. Description: Accomplishment of the events leading to the CFP, Event A9, should result in all the outputs necessary to develop an acquisition plan (Event A10):

(1) The Best Technical Approach(es) (BTA).

(2) A cost effectiveness comparison of the BTA and the base-line system.

(3) Issues, including personnel and training issues, yet to be resolved.

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(4) Organizational and operational concept(s).

b. <u>Output Usage.</u> The outputs described above are the basis for developing the Outline Acquisition Plan (OAP). The analyses described, together with additional materiel and personnel studies in Event A8, provide the information necessary for the ASARC/DSARC to reach a decision on whether to continue the program. Additionally, the COEA and supporting CTEA produced for the CFP form the basis for all future COEAs and CTEAs of the same system.

REFERENCES

AR 11-18, Army Programs--The Cost Analysis Program
AR 71-9, Materiel Objectives and Requirements
DARCOM Regulation 11-27, Life Cycle Management of DARCOM
                                Materiel
TRADOC Regulation 11-8, Cost and Operational Effectiveness
                                Analysis
TRADOC Regulation 351-4, Training Effectiveness System Management
TRADOC Pamphlet 11-8, Cost and Operational Effectiveness
                                Analysis
TRADOC Pamphlet 71-8, Analyzing Training Effectiveness
TRADOC Pamphlet 71-10, Cost and Training Effectiveness Analysis
                                Handbook
TRADOC-DARCOM Guide, Management and Control of COEA Cost Data
TRADOC-TACFIRE CTEA

EXAMPLES AND ILLUSTRATIONS

The format for the CFP from AR 71-9, Appendix H, is shown in Example III-3.

FORMAT FOR CONCEPT FORMULATION PACKAGE (CFP)

The Concept Formulation Package will be organized as described below and, as a minimum, will include the information indicated below. The detail and volume of the CFP will be simplified as appropriate to the complexity of the issues addressed and to the cost of the subject materiel.

    a.   Covering Letter. Letter including the following:

        (1) An introduction that describes the purpose of the package, how it is organized, and the magnitude of effort required to satisfy objectives of concept formulation.

        (2) A description of the system(s) (what the system is; what it is intended to do; threat environment in which it will operate; performance characteristics; new or unusual features; life cycle cost estimates; estimation of manpower requirements; systems being replaced; and competing systems). For tactical Automated Systems (TAS) a description of interoperability (and supporting communications) requirements, continuity of operations (CONOPS) provisions, security requirements and provisions, standards of hardware and software to which the system will adhere, and reliability, availability and maintainability (RAM) requirements must be included.

        (3) Needs and limitations affecting results and conclusions provided in the appendices (e.g., unusually stringent performance characteristics, surety aspects, fiscal guidance and funds availability, urgency of need, and requirement to accelerate development).

    b.   Trade-off Determination (TOD) appendix (prepared by the materiel developer).

        (1) Description of the individual technical approach(es), including consideration of proposed product improvement and procurement of non-developmental systems (e.g., commercial, other Service, other nation) as an alternative to new development.

        (2) Evidence that the proposed technical approach(es) is engineering rather than experimental, with an indication of the technical risks.

    Example III-3. Format for Concept Formulation Package (CFP)

(3) Enumeration of trade-offs required for the suggested approach(es).

(4) Estimated life cycle costs and scheduling estimates as related to acquisition of the item.

(5) The recommended technical approach (including technical analysis or trade-offs, risks, capabilities needed, costs, schedules, integrated logistic support requirements, estimated total Army manpower requirements, and environmental and ecological factors inherent in the technical approach(es).

c. Trade-off Analysis (TOA) appendix (prepared jointly by the materiel developer and the combat developer).

(1) Mission and Performance Envelopes (MPE) with justification and rationale.

(2) Analysis of system trade-offs, risks, capabilities, estimated total Army manpower requirements, costs, schedules, and logistic support.

(3) Selection of the best approach(es) from an operational and integrated logistic support aspect and establishment of environmental and ecological factors that must be faced by the Army in fielding the system.

d. Best Technical Approach (BTA) (prepared jointly by the materiel developer and the combat developer).

(1) Description of the Best Technical Approach and integrated logistic support concepts based on the results of the TOD and TOA.

(2) Evidence that the proposed Best Technical Approach is an engineering process rather than an experimental process.

(3) Estimated cost (RDT&E, OMA, MCA), estimated total Army manpower requirements, procurement and scheduling estimates.

(4) Recommendation as to whether the development should be project managed.

(5) A Draft Environmental Impact Statement will be included in accordance with Appendix I.

Example III-3 (Continued)

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e. Cost and Operational Effectiveness Analysis (COEA) appendix (prepared by the combat developer).

(1) Costs.

(a) The costs for each COEA alternative should specify what costs are included as defined by the Key Cost Categories.

(b) Hardware should be specified by quantity and Life-Cycle-Acquisition cost in each COEA alternative.

(c) Costs of specific concern to the combat developer: Training costs, ILS and Force Costs, should be presented separately. Other costs not included because of wash-out effects, sunk or unknown should be noted in the text.

(d) Application of cost categories should be appropriate to each COEA alternative, so that none is biased.

(e) COEA alternative costs may be represented by cost differences between the specific action alternatives and the baseline case. Note that these costs are used for decisions that may affect budgeting, but are not figures that can be used directly in the budget.

(2) Operational effectiveness. Operational Effectiveness will be quantified to the greatest extent possible in terms of measures of effectiveness of the force in which the new system is included. Where data or techniques do not permit quantitative analysis of all important system aspects, such as reliability, availability, and maintainability (RAM), electromagnetic capability, logistics, and realistic battlefield environmental conditions, a qualitative evaluation should be used to expand the quantitative assessment.

(3) Cost effectiveness. The candidate systems are structured into COEA alternatives, defining fielding alternatives for the candidates, including combinations of them if appropriate. These action alternatives are then contrasted to the baseline alternative (status quo), by ranking through cost effectiveness or relative worth ratios, modified by experience and military judgment where appropriate.

Example III-3 (Continued)

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10. EVENT A10--OUTLINE ACQUISITION PLAN (OAP)

OVERVIEW

Purpose. The Outline Acquisition Plan (OAP) is the planning document for the initial development activities of the system. It incorporates the personnel test issues that must be validated during testing to identify task allocation, special personnel requirements, and confirmation of Basis of Issue Plan (BOIP) or Unit Reference Sheets (URS), and identifies training milestone and SPA requirements, as specified in AR 70-27 and AR 700-127. It is the document from which, after ASARC/DSARC approval, the Advanced Development RFP (Event B10) is prepared, and therefore should contain the planning information necessary to continue the development through DT/OT I.

Relation to LCSMM/IPS Events. The OAP, Event A10, uses the input from the Concept Formulation Package (CFP) and ongoing Personnel Studies (Event A11) to provide the basis for planning the acquisition process. Planning for training occurs in three general areas:

   a. Updating training development requirements
   b. Updating the OICTP
   c. Preparing the Training Testing Plan

This event corresponds directly to Event 9 of the LCSMM.

TSM/POC Responsibilities. The development command prepares the draft of the OAP and coordinates the draft with the system proponent. Separate coordination may be necessary for Section IV (Coordinated Test Program) and Section V (Plan for Personnel and Training Requirements). The development command is the overall proponent for review and approval; in the case of non-major designated systems, that may be TRADOC. As a minimum, the system proponent (usually TRADOC), in coordination with ADMINCEN and LOGCEN, will assist in determining the personnel and training related issues still to be resolved.

Phasing. Acquisition planning begins with the development of the CFP and continues until an RFP is issued. The events leading to the OAP, other than the evaluative studies incorporated in the CFP, consist of a series of personnel studies, as necessary (AR 70-8). These studies should begin as soon as the issues are determined and continue throughout the development. They must, however, provide the best available estimates during preparation of the OAP, along with issues remaining to be resolved, and recommended methods of resolution.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A10.

The materiel developer prepares the OAP in accordance with
AR 70-27 and AR 700-127. It consists of six sections:

      Section I   System Concept Summary
      Section II   System Concept Requirements and Analysis
      Section III   Plans for System Concept Development
      Section IV   Coordinated Test Program
      Section V   Plan for Personnel and Training Requirements
      Section VI   Plan for Logistic Support

The training developer's input is required in Sections IV and V.
Section IV requires the preparation of a Training Test Plan from the
information provided in the OICTP and the updated training development
requirements on high-risk tasks. Section V also requires the input
for the OICTP to develop issues and criteria for test and evaluation
at DT/OT I. The personnel studies relating to those sections is
discussed under Event A11.

INPUT DATA/EVENT DATA BASE

As noted the basic inputs required of the TSM/POC are the updated
training development requirements and the updated OICTP. These are
prepared and continuously revised by the proponent TRADOC school.
Additional input information for use in personnel studies can be
gained from ADMINCEN, MILPERCEN, and LOGCEN.

OUTPUTS AND END PRODUCTS

    a.   <u>Description</u>: Accomplishment of the events leading to
         Sections IV and V of the OAP provides:

         (1)   Updated Training Development Requirements
         (2)   Updated OICTP
         (3)   Training Test Plan

    b.   <u>Output Usage</u>: These outputs are used to structure the AD
         Contract RFP (Event B1) to allow for resolving of the
         personnel and training issues stated. The planning should
         include consideration of contractor and/or in-house testing
         and validation of training development prior to conduct of
         DT/OT I.

REFERENCES

        AR 70-27, Outline Development Plan/Development Plan
        AR 70-8, Personnel Performance and Training Program (PPTP)
        AR 71-2, Basis of Issue Plan
        AR 700-127, Integrated Logistic Support
        DARCOM Pamphlet 700-9-1, Guide for Integrated Logistic
                          Support During the Conceptual Phase
        ARI TR-78-A7, TSM Guide to Training Development and
                    Acquisition for Major Systems

EXAMPLES AND ILLUSTRATIONS

      The procedures and outline of the OAP can be obtained from
AR 70-27 and AR 700-127.

11. EVENT A11--PERSONNEL STUDIES

OVERVIEW

      Purpose. The purpose, as set forth in AR 70-8, that relates to
the IPS/LCSMM is to "provide for the orderly, disciplined transition
of programs from research and exploratory development to advanced
development." These studies must conform to the guidelines of the
Personnel Performance and Training Program (PPTP). They are used to
research problem areas identified by the materiel developer and system
proponents during concept formulation.

      Relation to LCSMM/IPS Events. The personnel studies are deve-
loped from the issues designated in the CFP (Event A8) as needing
further research. These studies can begin at any time after the initial
organizational, personnel training, and logistic evaluations have
identified the issues to be studied and the OAP (Event A10) has been
approved. The OAP will provide the data necessary for the studies to
be included in the RDTE package under the PPTP.

      TSM/POC Responsibilities. The TSM should monitor the updating of
training development requirements and the OICTP. These activities
will normally be performed by the training developer at the proponent
TRADOC school. The TSM may also coordinate the acquisition of basic
data necessary for personnel trade-off studies from MILPERCEN,
ADMINCEN, and LOGCEN as required. The study program is executed
through two developing agencies, ARI and DARCOM, but these studies are
accomplished in close coordination with the system proponent and the
above mentioned agencies (MILPERCEN, etc.).

      Phasing. Phasing of the personnel-related studies becomes
important because of the continuous updating of these studies and

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the necessary interchange of basic data and results. The phasing problem is two-fold. First, cut-off dates are necessary, at which time "best estimates" are provided to the next study. The research then continues to its conclusion. Accompanying the best estimates must be a listing of the issues remaining to be resolved and a plan for their resolution to be incorporated in the acquisition and test plans.

Secondly, the proponent research agency, because it is required to study many systems, must have advance notice of when a particular study is to be performed. The agency may develop its study schedule as much as two years in advance and, with limited analytical resources and RDTE fundings, sets priorities on milestones and amounts of effort for each. To insure adequate lead time, the TSM/POC should anticipate, if possible, the training issues that will require study and discuss these requirements with the training developers and proponent research agency.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A11

Personnel Studies, as described by AR 70-8, Personnel Performance and Training Program, is a broad area. The emphasis is on human factors in system development and operation but also includes personnel and management systems, and education and training systems.

The studies in the training area include the training of individuals and units and involve improving methods of developing, delivering, conducting, and evaluating training. The areas requiring study may have been identified in the development of the ICTP or TSP or during the conduct of the CTEA. These areas for further study are listed in the CFP.

These studies also include RDTE on simulation and training devices. The research will indicate the concept or approach for designing the training device to insure maximum compatibility with the overall training requirements. The concept will then be supported by a CTEA. The requirement for a simulator or training device may require the initiation of a Training Device Requirement (TDR), depending on the preparation procedures designated for the Required Operational Capability (ROC).

The methodologies used for these studies are too numerous to discuss here. They are the result of the continuing research of ARI, HEL, and other agencies and are generally specific to the type of problem being solved. They were developed for such efforts as selecting appropriate training media for critical tasks, assessing trade-offs of machine versus human functions, and structuring organizations

for optimum personnel utilization. TRADOC is responsible for determining the issues; ARI and/or HEL is responsible for choosing the appropriate methodology.

INPUT DATA/EVENT DATA BASE

a. <u>Research Issues</u>. The research issues are developed from the initial evaluations performed to determine the organizational personnel, training, and logistic requirements of the new system. They should be well documented in the COEA and TOA sections of the CFP.

b. <u>Basic Data</u>. Basic data to perform the research can come from many sources. The best initial source is any recent similar effort that may be available from ARI or from the Training Developments Directorate of the proponent school.

OUTPUTS AND END PRODUCTS

It is TRADOC's responsibility to apply the RDTE results to training. This can be accomplished through the TSM for a particular system. The output of any research will be used to revise the ICTP as appropriate and to provide additional information for the next CTEA update.

REFERENCES

AR 5-5, The Army Study System
AR 70-1, Army Research, Development and Acquisition
AR 70-8, Personnel Performance and Training Program (PPTP)
AR 70-55, Management of US Army Research and Development Center
       and Laboratories
AR 602-1, Human Factors Engineering Program
AR 71-7, Military Training Aids and the Army Training Aids Center
       System
DA Pamphlet 5-5, Guidance for Study Sponsors and Study Advisory
       Groups

12. EVENT A12--ASARC I/DSARC I/IPR

OVERVIEW

<u>Purpose</u>. The Army Systems Acquisition Review Council (ASARC), the Defense Acquisition Review Council (DSARC), and the In-Process Review

held by the proponent command are groups of top managers meeting to decide the future course of action in the acquisition of new systems. The number and level of the meetings--command, Army, and Defense--are a function of the importance and cost of the system (AR 15-14).

Relationship to LCSMM/IPS Events. The Outline Acquisition Plan, A10, contains the information necessary for the review process. If approval is received at each necessary review, the OAP, with the suggested modifications, if any, will become the basis for the proto-type contract. This event corresponds directly to Event 14 of the LCSMM.

TSM/POC Responsibilities. The TRADOC representative will be a member of an ad hoc working group formed approximately 11 months before the scheduled ASARC. This group will determine the issues requiring resolution prior to the ASARC. The TSM must insure that the issues determined in the areas of logistics, personnel, and training are forwarded to the appropriate agencies for resolution. He will be called upon to brief the items pertaining to the proponent listed for the agenda at the ASARC meeting.

Phasing. Approximately 4 to 6 months before a scheduled milestone (I, II, or III) decision for as OSD major system, the DSARC will initiate action to request a milestone meeting. Approximately 11 months before a scheduled ASARC, the ad hoc planning meeting will be held and an agenda for the ASARC will be established as an enclosure to the ODCSRDA guidance directive in accordance with AR 15-14.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT A12

Guidance for preparing for the review procedures is provided by DOD 5000.2 and AR 15-14. Prior to an ASARC a preliminary review will be held to clearly define the major issues and insure that an ASARC is necessary at that point in system development. This preliminary review is generally held one month before the ASARC. The issues to be addressed are, of course, specific to the system being reviewed but a general agenda will be followed for most meetings:

- o   Mission Element Need
- o   Threat Assessment
- o   Operational Concept
- o   Standardization/Interoperability
- o   COEA
- o   Technical Assessment
- o   Integrated Logistic Support (ILS)
- o   Testing
- o   Cost
- o   Other Issues

Most of the information needed by the decision makers will have been generated for the OAP in the form of the TDA, the TOA, the COEA and supporting CTEA, and the supplemental studies of personnel issues. These are usually, however, issues specific to the system that the STF/SSG or ASARC will require responses to, such as:

o   What is the sensitivity of the system plan to changes in the projected threat?

o   What is the effect on training requirements for the system created by the all volunteer Army?

These questions should be formulated as early as possible by the SGT/SG so that they may be included as Essential Elements of Analysis (EEA) in the TOA, COEA, or CTEA. If they are not raised as issues until the preliminary ASARC is held, the formal ASARC may be delayed until they are resolved.

INPUT DATA/EVENT DATA BASE

Output of Event A10.

OUTPUTS AND END PRODUCTS

a.   ASARC/DSARC/IPR Review

Description: A decision to continue to the Demonstration and Validation Phase by issuing a prototype contract.

Output Usage: To develop the prototype contract.

Availability Requirement: Immediate upon decision.

b.   Study Issues

Description: Identification of further personnel and training issues deemed important enough for resolution prior to Milestone II but not critical enough to with-hold decision at Milestone I.

Output Usage: Issues for personnel studies (AR 70-8), and for inclusion in OT I, COEA, and CTEA updates.

Availability Requirement: Immediate upon decision.

REFERENCES

DODD 5000.1, Major System Acquisition
DODD 5000.2, Major System Acquisition Process

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DODD 5000.26, Defense Systems Acquisition Review Council (DSARC)
AR 15-14, Systems Acqusition Review Council Procedures

EXAMPLES AND ILLUSTRATIONS

See AR 15-14.   The checklist for Milestone I Reviews (Appendix
A) is reproduced here as Example III-4.

APPENDIX A
CHECKLIST FOR MILESTONE I REVIEWS
(END EXPLORATION OF ALTERNATIVE SYSTEM CONCEPTS PHASE,
BEGIN DEMONSTRATION AND VALIDATION PHASE)

The following items will be reviewed at Milestone I:

a. *Need.* The mission element task is reaffirmed to be essential.

b. *Threat.* The threat is credible, addresses the correct timeframe, has been validated by CG. INSCOM, in coordination with ACSI and, when appropriate, by DIA.

c. *System alternatives:*

(1) Satisfy the mission element need(s).

(2) Adequately reflect the technology base.

(3) Provide an acceptable competitive environment.

(4) Consider:

(a) Existing military and civilian equipment.

(b) Use of available subsystems.

(c) Product improvement of existing systems.

(d) Foreign and other services' systems.

(5) Provide for service and NATO standardization and interoperability.

(6) Ensure joint service, interoperability, and multinational considerations are adequately treated in the planning.

(7) Include environmental considerations (DODD 6050.1).

(8) Ensure COEA supports system(s) selected for demonstration and validation.

d. *Operational Factors.*

(1) Cost performance tradeoffs.

(2) Electromagnetic compatibility.

(3) Vulnerability to EW/SIGINT.

(4) Minimum operating personnel.

e. *Logistical Factors.*

(1) Minimum O&S costs.

(2) Minimum maintenance and support personnel.

f. *Acquisition Strategy.* Ensure it is complete, effectively integrates the program technical, business, and management elements and supports the achievement of program goals and objectives.

(1) Short- and long-term business planning effectively supports the acquisition strategy.

(2) Producibility and production risk considered.

(3) Competition maximized.

(4) Contractor structures; types of contracts.

g. *Constraints.*

(1) Established program constraints are still valid.

(2) Projected characteristics (including projected resource investment) consistent with established restraints.

h. *Risk.* Areas of risk and uncertainty identified and adequately treated in planning.

i. *Testing.*

(1) Issues to be addressed.

(2) Adequacy of planning and scheduling for preparation of the Coordinated Test Program (CTP).

j. *Program Management Structure.*

Figure III-4.   Checklist for Milestone I Reviews

SECTION IV

IPS MODEL:
DEMONSTRATION AND VALIDATION (DVAL) PHASE

A. OVERVIEW

The purpose of Phase II of the Validation Phase of the LCSMM is
to demonstrate and validate the materiel concept developed during
Phase I and to develop solutions to problems identified in the Outline
Acquisition Plan (OAP). Phase II is also concerned with demonstrat-
ing, validating, and refining the logistics support concepts developed
during Phase I. This includes the plan for training personnel to
operate and maintain the system. This section describes the major
events which comprise Phase II. The relationship between these events
is shown in Figure II-4.

B. SCOPE

During the early portions of Phase II the training developer con-
centrates on "high-risk" training tasks. Using task and skill analysis
data prepared by the contractor, the training and materiel developers
identify a set of high risk tasks for which training will be provided
in preparation for Operational Test I. The materiel developer will
assure that appropriate draft training and technical material is pre-
pared. The training developer also will prepare draft training
material, as agreed upon with the materiel developer, in the form of
draft Field Manuals, tactical training guidance, ARTEPS, and Soldier's
Manuals for high-risk tasks associated with tactical employment. The
actual training of operators and maintenance personnel for OT I
usually is accomplished by the contractor.

Much of Phase II is devoted to planning for, conducting, and eva-
luating the results of DT/OT I. The training developer will be repre-
sented on most planning committees and will be responsible for
developing critical test issues related to training problems.

Following OT I the training developer prepares a position paper
on the effectiveness of the training for the OT and has the option of
expanding this paper into an Independent Evaluation Report (IER).

Based on the results of OT I, the training developer devotes the
remainder of Phase II to updating and refining the Outline Individual
and Collective Training Plan (OICTP) and the Training Support Plan.
These plans are incorporated into the Required Operational Capability
(ROC), or Letter Requirement (LR), and the Acquisition Plan (AP).

The major Phase II IPS events are shown in Figure II-4 and in the Phase II chart in the back of this handbook. For additional information on Phase II events and their relation to LCSMM, see the DARCOM-TRADOC Handbook, Technical Documentation and Training Acquisition, TRADOC Circular 351-8, and ARI-TR-78-A7.

C. DISCUSSION OF EVENTS

1. EVENT B1--ADVANCED DEVELOPMENT PROTOTYPE CONTRACT

OVERVIEW

Purpose. The purpose of Event B1 is to update the OAP, issue an RFP, and choose a contractor(s) for the Demonstration and Validation (DVAL) Phase (Phase III). The event includes the following steps:

a. Submitting the Determination and Funding (D&F) for Secretarial approval.

b. Tailoring the RFP to assure that only essential data and reports are requested for the Advanced Development Prototype contract.

c. Announcing the source selection and contract award.

Relation to LCSMM/IPS Events. The Advanced Development (AD) Prototype Contract is a direct output of the OAP and any revisions and updates required by the review and discussion meetings, Event A12. Event B1 is covered in Events 15 and 16 of the LCSMM.

TSM/POC Responsibilities. The materiel developer has overall responsibility for preparing the RFP, awarding the contracts, and monitoring the developmental contract(s).

The TSM should be responsible, and have joint sign-off authority, for training developments and other support subsystem inputs to the RFP. The proponent organizations (e.g., proponent school) should prepare the specifications. The TSM should review specifications to ensure their completeness before submitting them to the materiel developer. The TSM should coordinate specifications for front-end analysis (FEA) and skill performance aids (SPA) with the logistics proponent, training device specifications with the training device developer, and specifications for embedded training and test equipment with the materiel developer.

The TSM should have responsibility for the development of "in-house" specifications for the Outline Individual and Collective Training Plan (OICTP) and for the validation and verification of developmental products.

The TSM should establish, through the materiel developer, a liaison with the training development contractor.

Phasing. As with many earlier events, the phasing is system-specific. The event should, however, be undertaken as soon as possible after the DSARC decision to proceed with the project. Simultaneous contractor selection and contract award are preferable, as described in Army Pamphlet 11-25, but this is not always possible.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B1

Guidance on the issues to be resolved in developing the RFP is well documented in the ARI TR-78-A7 and is paraphrased here. Specifications for training development are derived from the requirements described in the OAP and outline the work to be accomplished by the developmental contractors.

Training developments are to occur on two levels during the Validation Phase:

a. Training materials and SPAs are to be provided at OT/DT I for high-risk training tasks.

b. Analyses and training requirements for other (low risk) tasks will proceed sufficiently to access operator/maintainer capabilities for OT/DT I.

Also, components that are expensive and require a long lead time (e.g., simulators) are to be developed and provided (in at least "breadboard" form) for OT/DT I, as are embedded test equipment and embedded training.

A key to the scope of work required during validation development is the accuracy of the high risk task list provided in the specifications. Provisions must be made in the contract for revision and refinement of this list early in the contract stage as the contractor proceeds with FEA. To accomplish this, the contract must assure interaction among training developers and the contractor. Some systems may have the contractor as a training developer, but a requirement remains for interaction by the TSM to monitor the training developments process.

A background section describing what is necessary during valida-
tion is required in the RFP. The role of OT/DT I is primarily to
ensure that developmental products have achieved their stated goals.
The "increased emphasis on testing" dictates that provisions be built
into the developmental cycle to ensure thorough validation of indivi-
dual products before they are submitted for overall system operational
testing. Procedures and facilities (e.g., proving grounds,
laboratories) are well established for DT of hardware components.
Apparently the same capability does not exist for testing and eva-
luating other subsystems, so procedures should be established and
resources identified as part of the developmental effort.

Test and validation requirements that are to be met by the
contractor should be made part of the training input to the RFP.
Areas of concern include the following:

    a. Specifications for development of the OICTP should be prepared.
       Although this is mainly an in-house activity, the OICTP is a
       "product" to be evaluated at OT/DT I, and the specifications
       for its development will enable the parties responsible for
       ensuring its development to monitor its progress.

    b. Training (and other support subsystems) developers should plan
       an active role in the evaluation of proposals and should make
       recommendations for contractor selection based on the quality
       of the proposal and qualifications of contractor personnel
       to perform the FEA and training developments. Criteria for
       proposal evaluation should be prepared.

    c. Following contract award, close coordination with the contrac-
       tor will be required to:

       (1) Ensure the contractor is included in the flow of information.
       (2) Monitor progress of developmental activities.
       (3) Participate in validation and verification of products.

Although overall contract responsibilities reside with the materiel
developer, it should be a TSM function to provide quality assurance
monitoring for training developments. The TSM should, at least, have
joint "sign-off" authority over training development products.

Specific guidance on Army procurement procedures is provided in
AR 715-6. TRADOC provides documentation on standard paragraphs for use
by the TSM in the RFP to incorporate the above issues.

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INPUT DATA/EVENT DATA BASE

The training input data requirements for the contract are the latest available information on the training issues involved, from Events A10 and A11. There may be a requirement, designated by the review process, for an updated COEA and CTEA prior to the contract. This, however, would be system specific.

OUTPUTS AND END PRODUCTS

a. Outline Acquisition Plan Update

Description: Any update to the OAP by the combat developer, trainer, logistician, and operational tester required by the materiel development to reflect current conditions.

Output Usage: To prepare RFP.

Availability Requirement: As soon as possible after SECDEF approval.

b. Request for Proposal (RFP)

Description: A request for proposals from contractors to implement the full-scale engineering development phase.

Output Usage: To select contractor.

Availability Requirement: As soon as possible after SECDEF approval.

c. Contract for Advanced Development Prototype

Description: The contract between materiel developer and selected contractor(s) for the advanced development prototype(s).

Output Usage: To procure the desired materiel and services.

Availablility Requirement: As soon as possible.

REFERENCES

AR 715-6, Armed Services Procurement
Regulation, Army Procurement Procedure

2. EVENT B2--CONTRACTOR-FURNISHED TASK AND SKILL ANALYSIS (TASA)

OVERVIEW

Purpose. During the Conceptual Phase a gross functional and task analysis was conducted (A3). On the basis of this analysis estimates of personnel and training requirements were developed and incorporated into the LOA (A5). The estimates were refined during the activities in Event A6 (Prepare Task Listing) and then used to develop an Outline Individual and Collective Training Plan (A7.1). The TASA estimates, the OICTP, and the accompanying Training Support Plan (A7) were all subject to examination and revision on the basis of personnel studies (A11) and CTEA/COEA studies (A9). The resulting refined estimates of personnel and training requirements were then incorporated into the Outline Acquisition Plan (A10).

The estimates used in the events described above were based on an equipment concept and must be verified by comparing them with estimates based on the actual materiel. This is initially accomplished by the contractor during Event B2 and then verified by the materiel developer and the training developer during Event B3.

During Event B2 the contractor prepares TASA data for each operator, maintenance, and other support position associated with the new materiel. In addition, the contractor identifies the mental, physical, skill, and attitudinal requirements associated with each task, and examines training device requirements. Emphasis is placed on those tasks identified as "high-risk" training tasks.

Relation to LCSMM/IPS Events. The contractor-furnished TASA data provide inputs to most of the training- and personnel-related events during the Validation Phase.

TSM/POC Responsibilities. The TASA data are generated during execution of the Logistic Support Analysis (LSA) program, which is a materiel developer responsibility. However, the training developer should carefully monitor the output of this program to assure that appropriate data are provided on high-risk training tasks.

Phasing. The training developer should have access to TASA data at least 18 months before OT I. The contractor may wish to revise or add to the data in the intervening period.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B2

The materiel developer conducts the TASA as part of the Logistics Support Analysis program, performed in accordance with procedures

described in AR 700-127 and DARCOM Supplement #1 to AR 700-127. The data sheets prepared during this program provide the primary means for generating and transferring information about the new materiel to the training developer.

The LSA program provides information about all operator and maintenance tasks. However, during OT I, the emphasis is on high-risk training tasks. Therefore, after the LSA program has provided an inventory of tasks, this inventory should be used to identify tasks that pose special training problems. The procedures for accomplishing this are described in TRADOC Circular 351-4.

The TASA information obtained as part of the LSA program does not provide all the information needed to develop a training program. Therefore, those high-risk tasks selected for training during DT/OT I should be further analyzed in accordance with procedures in Chapter 8, TRADOC Circular 351-4.

One input to Event B2 is the training and personnel information contained in the OAP (A10). Attached to the OAP should be the list of high-risk training tasks identified by the training developer. The contractor should compare this list of critical tasks with the list he developed. Discrepancies should be noted, and an indication of the impact of each discrepancy on the OICTP should be attached to the OAP. For each high-risk task identified, the contractor should provide an estimate of the characteristics (skill and knowledge, physical, etc.) required of the personnel responsible for task performance.

The OAP should also contain a description of estimated training device requirements. These should be confirmed by the contractor as a part of the AD Contract. In addition, the contractor-furnished TASA should identify training device requirements for high-risk tasks. These requirements should be compared with those described in the OAP. Discrepancies should be noted and the impact of these discrepancies described. Procedures for identifying training device requirements can be found in TRADOC Circular 70-1, and are discussed in this handbook under Event B18.

The task analysis documentation that should be provided for each high-risk training task is described in TRADOC Circular 351-4. This circular also contains flowcharts for assessing required abilities/skills.

Event B2 should be carefully monitored by the training developer since the data generated from this activity have impact on all subsequent training and personnel activities during the LCSMM. As noted in TRADOC Circular 351-4, the development of a task inventory and the selection of tasks for training are the most important activities in

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the training development procedure. All training plans are based on
these activities.

INPUT DATA/EVENT DATA BASE

a. AD Contract RFP

Description: This RFP should state the requirement for a
task and skill analysis for all tasks performed by system
operator and support personnel. As an aid to the contractor
the list of high-risk tasks developed during Event A6 should be
attached to the RFP.

Data Source: List of high risk tasks developed by the
training proponent during the Concept Phase.

When Available: Should be attached to AD Contract RFP.

Access Procedures: Should be attached to AD Contract RFP.

OUTPUTS AND END PRODUCTS

a. LSA Program Reports and Records

Description: TASA and other data for all operator and main-
tenance tasks, as described in AR 700-127 and MIL-STD-1388.

Output Usage: Provides basic input to all training and per-
sonnel-related activities during DVAL Phase.

Availability Requirements: Draft material should be
available about 18 months before OT I. Final version about
12 months before OT I.

b. High-Risk Task TASA

Description: A list of tasks identified as high risk
training tasks in accordance with procedures described in
TRADOC Pamphlet 351-4. For each task the following infor-
mation should be provided: (1) estimates of prerequisite
skill and knowledge requirements; (2) estimates of mental/
physical/attitudinal characteristics, and (3) estimates of
training device requirements.

Output Usage: See a. above.

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<u>Availability Requirements</u>: See a. above.

REFERENCES

     AR 700-127, Integrated Logistic Support
     DARCOM Supplement to AR 700-127 Integrated Logistic Support
     TRADOC Circular 70-1, Training Device Development
     TRADOC Circular 351-4. Job and Task Analysis
     TRADOC Pamphlet 350-30, Interservice Procedures for In-
                             structional System Development
     MIL-STD-1388-1, Logistic Support Analysis
     MIL-M-63035, Front-End Analysis

3.   EVENT B3--PERSONNEL TASK/SKILL EVALUATION

<u>OVERVIEW</u>

    <u>Purpose</u>. The purpose of Event B3 is to update the training and personnel information contained in the Outline Acquisition Plan. The personnel and training requirements listed in the OAP must be compared with similar estimates derived from prototype materiel. Discrepancies must be resolved by conferring with the contractor, after which the OICTP and the Training Support Plan should be revised as required. During Event B3 special emphasis should be placed on the initial vali- dation of the list of critical tasks for which training material should be prepared prior to OT I, Event B5. Also, the contractor TASA should be used to reassess/revise the critical training issues to be tested during OT I.

    <u>Relation to LCSMM/IPS Events</u>. This event should occur con- currently with the later portion of Event B2, Contractor-furnished TASA. The contractor should be requested to provide a tentative TASA for each operator and maintenance position after the first version of the equipment prototype has been developed. Event B3 occurs during Events 17-20 of the LCSMM.

    <u>TSM/POC Responsibility</u>. The training developer is responsible for Event B3, but it must be performed in cooperation with the materiel developer, the logistic proponent, ADMINCEN, and MILPERCEN. If the event proceeds concurrently with Events B1/B2, interaction with the contractor should be coordinated with the PM since the PM has overall responsibility for monitoring the AD contract.

    <u>Phasing</u>. Event B3 should begin as soon as possible after Event B2 is underway, but at least shortly after development of the first materiel prototype. The event should be completed within 18 months of OT I because the output provides the data base for preparing the train- ing material for OT I.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B3

To the extent possible, this task should be accomplished as part of B2. As the contractor prepares TASA data, the training developer should periodically review the data generated to date. This may not be possible when DT/OT I involves competition between two contractors, since they may not wish to release any TASA information until time to train soldiers for conduct of OT I.

The first portion of Event B3 involves reviewing the TASA data for completeness. The training developer should ascertain that all obvious operator and maintenance tasks relative to each materiel subsystem have been covered. He can accomplish this by reviewing, with the materiel developer, the completeness of the LSA data.

As a second step, the training developer should review the list of high-risk training tasks. Each of these tasks should have been identified in accordance with procedures outlined in TRADOC Pamphlet 351-4. Documentation supplied with each high-risk task should support its selection in that category. Discrepancies between sponsor-developed and contractor-developed high-risk task lists should be resolved in consultation with the contractor. This process can be expedited by requiring the contractor to identify such discrepancies and the probable reasons for them.

For each high-risk task the contractor should provide additional information as specified in Chapter 8, TRADOC Pamphlet 351-4. These data include skill and knowledge prerequisites, special physical and attitudinal characteristics, unusual working/environmental conditions, training device requirements, training standards, and so on. The training developer should verify that these data have been provided and, if they have not, determine the reason(s) for their absence. In some instances, portions of the materiel will not have been designed by the time TASA data are needed, so the contractor may have to estimate data for certain tasks.

After verifying the TASA data, the training developer must use them to update the training and personnel estimates in the OAP. The general procedures for this step have been described under Events A4 (page III-14) and A7.1 (page III-31) and are also contained in TRADOC Regulation 350-2 and TRADOC Circular 351-8.

The training portion of the OAP contains a description of the test issues that should be assessed during OT I. These test issues must be revised as required to reflect any revisions in training and personnel requirements.

The TSM/POC and training proponent should examine the impact of any revisions in training or personnel requirements and alert the PM if the revised personnel/training requirements seem to exceed constraint levels described in LOA.

INPUT DATA/EVENT DATA BASE

a. TASA data provided by contractor.

Description: Logistic Analysis Reports covering all opera-
tor, maintenance, and other support tasks. For high-risk
training tasks, additional data as required for the perfor-
mance of complete front-end analysis for training purposes
(see TRADOC Pamphlet 351-4).

Data Source: Contractor.

When Available: Should be supplied about 18 months prior to
OT I. Highly competitive contractors may not make these
data available until just before DT/OT I. In such cases the
contractor will be responsible for providing the complete
training package for OT I.

Access Procedures: TASA data are specified as a deliverable in
AD Prototype Contract.

b. Personnel requirements/OICTP/critical issues information.

See Event A10 (page III-55) for description of contents of OAP.

OUTPUTS AND END PRODUCTS

a. Description. The major outputs of Event B3 are: (1) A
revised list of high-risk tasks; (2) revised TASA and
other data for operator and for maintenance tasks; and
(3) a revised list of personnel and training requirements.

b. Output Usage. As shown in the Phase II chart, the products
of Event B3 provide all or part of the data base for all
subsequent events related to personnel/training that occur
during the Validation Phase. In particular, the data out-
puts are used to update personnel training factors cri-
teria (B5), to revise the Individual and Collective Training
Plan (B12), to update the personnel and training data (B14)
used to prepare the Preliminary Qualitative and Quantitative
Personnel Requirements Information (B15). The product of

Event B3 also is used to revise the OAP, Sections V and VI. (See DARCOM Supplement 1 to AR 700-127.)

c. <u>Availability Requirement.</u> At least 10 months before OT I.

REFERENCES

AR Regulation 700-127, Integrated Logistic Support
TRADOC Regulation 350-2, Development, Implementation, and
                    Evaluation of Individual Training
DARCOM Supplement #1 to AR 700-127, Integrated Logistic
                    Support
TRADOC Regulation 351-4, Job and Task Analysis
TRADOC Circular 351-8, ICTP for Developing Systems:
                    Policies and Procedures
TRADOC Pamphlet 350-30, Interservice Procedures for
                    Instructional System Development
TRADOC Pamphlet 351-4, Job and Task Analysis Handbook
DARCOM/TRADOC Handbook, Technical Documentation and Training
                    Acquisition

EXAMPLES AND ILLUSTRATIONS

See Annex.

4. EVENT B4--INPUT FOR DT/OT I

OVERVIEW

<u>Purpose.</u> Two sets of deliverables must be prepared before DT/OT are conducted: the Test Support Package and the Independent Evaluation Plan. The Test Support Package (TSP) provides the means for training soldiers to conduct an OT; the maintenance, POL, etc. to sustain the OT; and the description of how the system should be deployed during the OT (mission profile, logistical concepts, tactical doctrine, etc.). The Independent Evaluation Plan (IEP) identifies the issues to be answered, the data sources for each issue, and an evaluation scheme. The IEP is further refined by a Test Design Committee until it becomes a Detailed Test Plan describing how the OT will be conducted/controlled, how the data will be collected, and how they will be analyzed.

The TSP and IEP packages are developed concurrently although completion of the IEP should precede the TSP by a few months. In this handbook the IEP will be discussed under Event B5. The following discussion of Event B4 will concentrate on preparing the TSP.

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Relation to LCSMM/IPS Events. This event is part of Events 19 and 20 of the LCSMM. For larger systems it should begin about 18 months before the scheduled time for OT I. It should start after the contractor TASA has been prepared. As already noted, however, TASA data may not be available until shortly before OT I. In such cases this event must proceed on the basis of personnel, training, and test issues contained in the Outline Acquisition Plan.

TSM/POC Responsibilities. The TSM/POC is responsible for insuring that input from the combat developer/trainer (normally the schools), ADMINCEN, and LOGCEN is included in the Test Support Package. The materiel developer provides two hardware-related packages, a maintenance test support package, and a new equipment training test support package.

To furnish TRADOC inputs to DT/OT I, the TSM/POC has to coordinate the activities of various agencies (ADMINCEN, LOGCEN, the combat developers, and the training developers). Elements of the TSP provided by the combat developer include test packages addressing means of employment, organization, logistical concepts, mission profiles, appropriate test settings, and a threat statement. The training developer provides appropriate portions of the training element to the TSP.

For OT I the bulk of the training element is provided by the materiel developer and usually consists of contractor-prepared and administered training. The training developer (TSM/POC and TRADOC school proponent) provides training related to the tactical deployment of the new equipment.

Phasing. Most of the TSP is needed by the Special Task Force 6 to 12 months prior to the test. An outline of the TSP is needed 15 months before OT I, for use by the Test Development Committee during the development of a Detailed Test Plan (DTP).

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B4

The TSM coordinates the input of various agencies (ADMINCEN, LOGCEN, combat developers, and training developers) required for production of the Test Support Plan for OT I. Since DT I is conducted exclusively by the materiel developer, and is materiel oriented, TRADOC does not normally provide input for DT I even when DT I is combined with OT I.

The elements provided by the combat developer are described briefly below but the general procedures for developing them are not presented.

a. **Means of Employment.** Statement of doctrine, tactics, tech-
    niques, logistical concepts, and means of employment for
    the tested system. The doctrine package should include
    enough detail to permit realistic system employment
    at each test level (e.g., tactical unit SOP, crew drill,
    combat exercise, and operator manuals). It is used to
    guide the development of test events in test design planning
    and to govern user troop actions during the test.

b. **Organization.** Statement of MOSs, basis of issue, unit struc-
    tures, and line of command or coordination for units
    employing tested systems. When new MOSs are included, a
    description of specific duties of individuals in each new
    MOS is required. It is used to structure the player units in
    test planning.

c. **Logistical Concepts.** Statements of applicable supply,
    transportation, and maintenance concepts, and including proce-
    dures compatible with the maintenance support packages pro-
    vided by the materiel developer. They are used to govern
    support actions during the test and to plan data collection
    in the areas of reliability, availability, maintainability,
    and logistical support.

d. **Threat.** Statement of potential threat in Initial Operational
    Capability (IOC) time frame relating to the tested system,
    including capabilities, typical means of operating, and known
    methods of defeating the system. It is used to guide deve-
    lopment of test conditions in test design planning and to
    govern aggressor elements in the test.

e. **Mission Profiles.** Statement of types and frequency of events
    in the combat missions involving the tested system. This
    takes the form of either a set of alternate mission profiles
    or a typical profile plus statistical distribution of fre-
    quency of events. It also includes estimated or actual
    duration times of events and the times between events. It is
    used to guide test design planning of conditions and events.

f. **Test Setting.** Statement of plausible situation to show
    interaction between threat, friendly actions, and environment
    involving tested system. It is in the form of a standard
    TRADOC scenario to provide the situation in which the speci-
    fic test events are set. It must be compatible with Item d.,
    Threat. It is used to guide test design in the test setting
    and environment.

The training developer is responsible for providing certain ele-
ments of the test support package. He identifies the training con-

tents needed for this package in cooperation with the materiel
developer. During the preparation for OT I, the contractor ordinarily
supplies the training, using contractor-provided training material and
aids, training devices, and Program of Instruction. The actual por-
tions of the training material to be supplied by the materiel and
training developers should be determined on a case by case basis as
described in TRADOC Regulation 350-2.

The materiel and training developers should have joint sign-off
authority on training material. In particular, the POI used during
DT/OT I should be approved by the training developer.

Appendix B, TRADOC Circular 351-8 identifies the important training
products that should be developed prior to OT I. They include:

a. Synoptic outline for technical manuals (TMs) and preliminary
   documentation and storyboard training materials for high-
   risk training tasks.

b. Draft Training Extension Course material.

c. Brassboard configuration of training device(s) for high-risk
   training tasks.

d. Draft collective training material for high-risk tasks.

During OT I two major training issues will be examined: (a) Does
the training material effectively teach what it was designed to teach,
and (b) can persons trained to standards proficiently operate/maintain
the equipment? The answer to the second question depends in large
measure on the adequacy of the task inventory and the list of high-
risk training tasks selected during Event B3. The answer to the training
effectiveness question depends on the care with which the training
material was developed and validated. Therefore, the training
material prepared for OT I should be developed and validated in accor-
dance with procedures described in ISD documents (TRADOC Pamphlet 350-30).

The training materials and devices to be used to train soldiers
for OT I should undergo their own validation. Preferably this should
be done some months before OT I so that, if needed, the material can
be modified by the time the OT occurs. In practice, the training is
often both tested and validated when first used to train operators for
OT I. This is a risky practice because defects in the training
material may have a negative impact on other portions of the OT.

Prior to OT I the TSM/POC and training component have the joint
responsibility, with the materiel developer, of monitoring the deve-
lopment and test/validation of training material and devices.

INPUT DATA/EVENT DATA BASE

a. Means of Employment

Description: Designation of FMs and related documents relevant to the test system, preferably in the form of documentation produced for the test but acceptable in the form of documentation for the replaced system(s) with supplemental notation as to changes required by the new system.

Data Source: Combat developer.

When Available: Needed during the Special Task Force (Event 3 in LCSMM).

Access Procedure: Obtain from the combat developer.

b. Organization

Description: Trial Table of Organization and Equipment (TOE) for lowest level of unit employing system (squad, crew, or section), plus trial TOE for next higher echelon unit and lines of coordination and communication through the division level.

Data Sources: ADMINCEN and the combat developer.

When Available: Needed during the Special Task Force (Event 3 of the LCSMM).

Access Procedure: Obtain from ADMINCEN.

c. Training

Description: Instruction by contractor or military personnel, probably using contractor-provided POI and training aids.

Data Source: Trainer and contractor.

When Available: Needed in outline form for the Special Task Force.

Access Procedure: This should be part of the package supplied by the contractor as specified in Event B1 of the IPS model (AD prototype contract) (pages IV-2).

d. Logistical Concepts

Description: Designation of relevant support documents
for operator servicing and organizational support, pre-
ferably in the form of documentation prepared for the test,
but acceptable in the form of documentation for the replaced
system(s) with notation as to changes required by the new
system.

Data Source: LOGCEN and the materiel developer.

When Available: Needed in outline form during Special
Task Force

Access Procedure: Direct coordination with LOGCEN
and the materiel developer.

e. Threat

Description: Statement of potential targets, counter-
measures, and opposing weapons at the single system one-on-
one level. Statement should be based on DA-approved threat
as it pertains to the tested system.

Data Source: Combat developer.

When Available: Needed during Special Task Force.

Access Procedure: Obtain from the combat developer.

f. Mission Profiles

Description: A set of probable operational mission pro-
files including attack, defense, exploitation, retrograde, and
expected variations of each, or a list of probable types of
events for unit with tested system, with estimate of fre-
quency and duration of each type mission in operation.

Data Source: Combat developer.

When Available: Needed in outline form during Special
Task Force.

Access Procedure: Obtain from combat developer.

g. Test Setting

Description: Designation of appropriate geographic area
and generalized plausible friendly and aggressor situation,
probably in the form of a standard TRADOC scenario.

Data Source: Combat developer

When Available: Needed during Special task Force.

Access Procedure: Obtain from combat developer.

OUTPUTS AND END PRODUCTS

a. TSP Description: The test support package is structured to insure that all tasks associated with hardware are tested and/or evaluated. These include operations, maintenance, and support tasks that are required to make the system effective.

b. Output Usage. The TSP is delivered to the test organization to be used in preparing the test design plan.

c. Availability Requirement. Must be completed six months prior to OT I.

REFERENCES

AR 70-10, Test and Evaluation During Development and
          Acquisition of Materiel.
AR 71-3, User Testing (Force Development User Testing)
TRADOC Regulation 350-2, Development, Implementation, and
          Evaluation of Individual Training.
TRADOC Circular 351-8, Individual and Collective Training
          Plan for Developing Systems:
          Policies and Procedures.
TRADOC Pamphlet 350-30, Interservice Procedures for In-
          structional System Development
OTEA Operational Test and Evaluation Handbook
ARI-TR-78-A7, TSM Guide to Training Development and
          Acquisition for Major Systems.
Mitre Corporation, A Guide for TRADOC Systems Managers.

5.   EVENT B5--PERSONNEL/TRAINING FACTORS CRITERIA

OVERVIEW

Purpose. Developmental and operational tests must be conducted in accordance with a detailed test plan. This plan is developed by the independent test agency, usually the Operational Test and Evaluation Agency (OTEA). The training developer prepares the training inputs to the test plan. After an Independent Evaluation Plan (IEP), is developed and approved, successively more detailed test plans are

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developed until the final Detailed Test Plan (DTP) is prepared. The DTP describes the issues to be tested, how the test will be conducted and controlled, and how the test data will be summarized and analyzed. During development of the DTP, criteria must be established for evaluating the effectiveness of training material and devices and for assessing the degree to which personnel factors and requirements have been adequately identified.

Relation to LCSMM/IPS Events. During this event specifications are developed for the conduct of the training portion of OT I. Also, the measurement and data collection techniques developed during Event B5 provide the basis for the conclusions reached in preparing an Independent Evaluation Report, during Event B7.

TSM/POC Responsibilities. For major systems and designated non-major systems, Event B5 is the responsibility of the Operational Test and Evaluation Agency. For non-major systems, an element of TRADOC may be designated as the independent tester. When OTEA has the responsibility, the training developer will be represented on the Special Study Group that prepares the IEP and on the Test Development Committee that prepares the DTP.

Phasing. Preparation of the IEP begins about 18 months before the scheduled OT/DT I.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B5

The IEP states the critical issues to be answered, the sources of data for each issue, and the scheme for data evaluation. The training developer determines the training issues. The TSM/POC, with the assistance of ADMINCEN and MILPERCEN, coordinates the personnel issues. At a minimum two training issues will be assessed during OT I:

a. Are the training materials/devices developed for OT I capable of training soldiers to the desired standards?

b. Are soldiers trained to specified standards capable of performing on the equipment to required proficiency levels?

The Outline Acquisition Plan (A10) and the TASA data obtained from the contractor (B3) will either identify certain critical issues (e.g., reading level required for maintenance personnel for use of the technical manuals) or suggest that current selection standards for operator and maintenance personnel are adequate to provide suitable personnel to maintain the new system. In either case, a critical personnel test issue concerns whether personnel meeting the stated estimated personnel requirements for the new system can or cannot learn to perform proficiently on the system. The personnel issue may be stated as "What special aptitudes are required of operators of system X?"

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After the IEP is approved, the process of preparing a detailed test plan begins. Usually the persons who prepared the IEP form the nucleus of a Test Design Committee. This committee first prepares an Outline Test Plan (OTP). After the OTP is approval it is expanded into a Test Design Plan (TDP), which is submitted for approval to the DA Test Schedule and Review Committee. Once it is approved, the TDP is further expanded into a Detailed Test Plan (DTP), which describes the test scenario, the data to be collected, the test control procedures, and the data summary and analysis procedures.

The entire test planning process involves the successive refinement of a general test plan. The approach is basically as follows:

a. State the training issue to be examined. The issue might be: Can soldiers be trained to required standards using material prepared in accordance with the individual training plan for critical tasks?

b. Subdivide the general training issue into smaller, more definitive training issues, such as: (1) Is the classroom training effective? (2) Is the training device effective?

c. Further subdivide the training issues until statements of specific training issues for which data can be collected can be identified. Such issues might be: (1) Can soldiers be trained to standards on all operator tasks? (2) Does the POI cover all critical maintenance tasks? (3) Does SPA material effectively support all tasks not covered during classroom instruction?

d. For each detailed training issue identify the criterion for acceptable performance. For operator tasks it might be that 90% of the trainees can meet training standards on 90% of the operator tasks after going through the contractor training program.

e. For each training issue, identify the data that are required. In most cases these will be knowledge or performance test data or student/instructor opinions obtained via interviews or questionnaires.

f. For each major training issue, describe how data related to training subissues will be summarized and combined to obtain the second-order data necessary to evaluate major issues.

g. As appropriate, prescribe:

1. Test conditions
2. Number of trials required

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3. Comparisons to be made
4. Statistical, numerical, and non-numerical methodology

h. Describe the estimated characteristics of the target popula-
tion. Within each target population group, the persons
selected for operators and support personnel during OT I
should be fairly heterogeneous so that comparisons can be
made between background data and test results.

INPUT DATA/EVENT DATA BASE

a. Training and Personnel Test Issues as stated in OAP.

Description: In particular, Sections IV and V of the OAP
(the output from Event A10).

Data Source: DARCOM (System PM).

When Available: Prior to IPR/ASARC I/DSARC I.

Access Procedure: Request from System PM.

b. Personnel Task/Skill Evaluation

Description: Updated information on training/personnel
requirements and critical issues. (See description of Event
B3 output, page IV-9).

Data Source: TSM/POC or training developer.

When Available: 18 months before DT I. For highly com-
petitive AD prototype contracts data may not be available
before OT I.

Access Procedures: Obtain from training developer.

OUTPUTS AND END PRODUCTS

a. Description: An Independent Evaluation Plan that outlines
the approach to system evaluation, and a Detailed Test Plan
that describes the test issues, the conduct/control of the
test, the data to be collected, and the procedures for pro-
cessing the data.

b. Output Usage. Provides the data used by the operational
tester to produce the Independent Evaluation Reports. These

reports provide conclusions regarding the effectiveness
of the materiel and the logistics support package.

c.   Availability Requirement: Six months before DT I.

REFERENCES

TRADOC Regulation 350-2, Development, Implementation, and
                          Evaluation of Individual Training
TRADOC Regulation 700-1, Integrated Logistic Support
TRADOC Circular 351-8, Individual and Collective Training
                          Plan for Developing Systems: Policy
                          and Procedures
TRADOC Pamphlet 350-30, Interservice Procedures for Instructional
                          System Development
TRADOC Pamphlet 351-4, Job and Task Analysis
OTEA, Operational Test and Evaluation Handbook

6.   EVENT B6--DEVELOPMENT TESTING I (DT I) AND OPERATIONAL TESTING I (OT I)

OVERVIEW

Purpose. Developmental Test I (DT I) is conducted to demonstrate
that technical risks have been properly identified and that solutions
are feasible. Components, subsystems, brassboard configurations, or
advanced development prototypes are examined to evaluate the potential
application of technology and related design approaches prior to entry
into full scale development.

Operational Test I (OT I) is a test of brassboard configurations,
experimental prototypes, or advanced development prototypes to pro-
vide an indication of military utility and worth to the user. OT I
also provides basic data necessary for a decision to enter full-scale
development. Testing must refine critical issues and identify areas
that should be addressed in future testing. In general, OT I provides
the data to determine:

a.   Estimates of the potential of the new materiel system in
     relation to existing capabilities.

b.   Estimates of the relative merits of available competing pro-
     totypes or systems from the aspect of military utility.

c.   Estimates of the adequacy of the concepts for employment;
     supportability; trainability; organizational, doctrinal, and
     tactical requirements; and related critical issues.

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d. An early identification of operational problems in a field
    environment.

e. Critical issues for examination in OT II.

<u>Relation to LCSMM/IPS Events.</u> Event B6 encompasses Events 21
(Development Test I) and 22 (Operational Test I) of the LCSMM. It is
the direct result of decisions made at the IPR/ASARC I/DSARC I. The
data and results of this event provide input to and guide the develop-
ment of all subsequent events in the Demonstration and Validation
Phase.

<u>TSM/POC Reponsibilities.</u> Since the DT I and OT I are normally
conducted by independent test and evaluation organizations, the
TSM/POC has no direct responsibility. He does, however, provide repre-
sentatives to observe the testing.

<u>Phasing.</u> The Special Task Force or Special Study Group (Event 3
of the LCSMM) tentatively schedules the DT I/OT I.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B6

DT I is the responsibility of the materiel developer. Normally,
U.S. Army Test and Evaluation Command (TECOM), an agency of DARCOM,
conducts the DT at one of TECOM's proving grounds. The involvement of
the TSM in DT I is minimal. The TSM will normally be asked to send a
representative to act as an observer, and the TSM receives a copy of
the test report.

The DT and the OT are separately conducted, so the results of
one test should not influence the results of the other. OT I is, on
occasion, held jointly with DT I because of limited resources for the
test or when environmental or operational conditions preclude the
desired test realism. When this occurs, two separate test reports (one
for DT issues and one for OT issues) are still prepared and are
treated as if two separate tests did take place.

The Operational Test and Evaluation Agency conducts the opera-
tional testing for all major and selected non-major items. OT I
occurs early in the materiel acquisition process, when only a limited
number of brassboard configurations, experimental prototypes, or
advanced development prototypes and incomplete test support packages
are available for testing. The scope of OT I is tailored toward
searching for potential problems that could significantly affect the
military utility and the operational effectiveness of the system. The
following characteristics are of concern during OT I:

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a. <u>Size and Training of the OT I Player Unit.</u> An OT I is usually conducted with one prototype of the new system. Training is usually limited to individuals and crews. Data collection on training includes qualification tests at the termination of training (oral, written, and tactical exercises), plus performance data obtained during other portions of the test.

b. <u>Focus of OT I Data.</u> An OT I is generally limited and may not completely address all data areas. A limited test focuses on the primary system function (e.g., firepower for a weapon, mobility for a transport system) with individuals or single crews. The scope may be limited to obtaining sufficient data to permit evaluation of the system's military utility, compatibility with other systems, and identification of user problems when operating in the field.

c. <u>Type of OT I Events.</u> A small test does not allow large operations over extended time periods. An OT I focuses on a system operating in the field in accordance with an abbreviated mission profile. Each trial may require a few hours or a day with individuals, single crew, or a section.

d. <u>Type of Comparison in OT I.</u> The comparison is usually limited to an operator or crew using a single prototype of the new system versus the same crew using a single item of the old system. A second type of comparison is between competing equipments. At the time of OT I, the DARCOM Source Selection Board is often undecided on competing prototypes. While it is not the purpose of the OT to decide between equipments, the OT must completely test all competing equipments so that the ASARC II or IPR has an independent operational evaluation of all candidates. This means that OT I must provide comparative data on competing candidate systems useful to the Source Selection Board as a by-product of operational testing.

e. <u>OT I Treatment of Reliability, Availability, and Maintainability (RAM) Data.</u> RAM data are recorded and reported with the inherent statistical confidence obtainable from DT I and OT I subtests. Maintainability at the individual operator level can usually be addressed in OT I. Availability and reliability can be roughly inferred from failure data and individual maintainability.

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INPUT DATA/EVENT DATA BASE

a. Detailed Test Plan (DTP)

    Description: See description of the DTP in Event B4
    (page IV-12 and B5 (page IV-18).

    Data Source: Designated independent evaluation agency.

    When Available: Three months before OT/DT I.

    Access Procedure: Request from OTEA or other designated
    test agency.

OUTPUT AND END PRODUCTS

a. Description: The Test Report (TR) is a detailed description
    of the conditions under which the test was conducted and the
    findings resulting from the test. Unavoidable departures
    from the test plan are described and explained.

b. Output Usage. Provides the data and the testing condition
    descriptions needed to prepare an Independent Evaluation
    Report (Event B7).

c. Availability Requirement. Should be available one month
    following completion of OT I.

REFERENCES

    AR 70-10, Test and Evaluation during Development and
              Acquisition of Material
    AR 71-3, User Testing (Force Development User Testing)
    TRADOC Regulation 350-2, Development, Implementation,
              and Evaluation of Individual Training
    TRADOC Regulation 700-1, Integrated Logistic Support
    TRADOC Circular 351-8, Individual and Collective Training
              Plan for Developing Systems: Policy and Procedures
    TRADOC Pamphlet 350-30, Interservice Procedures for In-
              structional System Development
    TRADOC Pamphlet 351-4, Job and Task Analysis
    OTEA, Operational and Test Evaluation Handbook
    ARI-TR-78-A7, TSM Guide to Training Development and
              Acquisition for Major Systems
    Mitre Corporation, A Guide for TRADOC System Managers

7. EVENT B7--EVALUATE RESULTS OT/DT I

    OVERVIEW

    Purpose. Following completion of OT/DT I, an Independent
Evaluation Report (IER) is prepared, presenting a position on the
operational effectiveness of the materiel and of the logistics
support elements, independent of the materiel developer and the user.
Conclusions are drawn concerning each major test issue. Short-
comings and deficiencies of the materiel and logistics support ele-
ments are noted. The need for further exploration is also noted.
Reasons are provided in support of any contention that deficiencies
can be corrected without further testing.

    Relation to LCSMM/IPS Events. The IER, along with an accom-
panying CTEA/COEA, provides critical inputs to the Acquisition Plan,
Event B24; together they provide support for a recommendation to
continue or not to continue the materiel acquisition process. Also,
test data and conclusions contained in the IER are used to review
personnel and training requirements and to update the OICTP.

    TSM/POC Responsibility. For all major systems and for non-major
systems of special interest, the combat developer/trainer reviews the
IER covering operational, personnel, and training issues. The opera-
tional tester and the materiel developer each prepare separate IERs.
For non-major systems, elements within TRADOC may be tasked to func-
tion as the designated independent tester. When this is the case,
TRADOC also is responsible for preparing an IER as the operational
tester.

    Phasing. The IER should be prepared within three months after
completion of the OT.

    GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B7

    Preparation of an Independent Evaluation Report (IER) involves
four major steps: application of findings to the issues, synthesis of
subtest conclusions into conclusions about major test issues, report
assembly, and coordination and concurrence.

    As noted in the discussion of Event B4, the OT Detailed Test Plan
for training and for personnel should address at least three critical
issues: (a) Can soldiers be trained to specified standards using the
draft training material developed and training schedules prepared for
OT I? (b) Can soldiers trained to these standards perform proficiently
on the materiel? (c) What are the background characteristics of those
soldiers who could and could not be successfully trained to
operate/maintain the equipment?

The detailed Test Plan divided the major test issues into subissues. As a first step in preparing the IER, the IER team should assemble data pertaining to each subissue. The team should then assess the reliability and validity of each data element, establish verbal or numerical weights for each data eler 'nt if that is needed, and summarize data elements bearing on the same subtest issue into one or two findings. When the test findings for the individual subtest issues are ambiguous or conflicting, data developed outside the OT should be considered. Data from other studies or from personal experience may be cited to clarify test findings.

The OT data were obtained under specific test conditions. It may not have been possible to follow the Detailed Test Plan or, after the test plan was developed, it might have been decided that additional test conditions should have been included in the plan. In these cases, the IER team should submit the test data to a risk analysis. During this analysis, judgments should be made about the probability of similar data being collected if the test were rerun or if the test conditions had been different. Also, this risk analysis should note any deficiencies uncovered by the OT and discuss the probability of developing an acceptable technical fix for these deficiencies.

For each subtest issue, the IER team should prepare a conclusion-- an evaluative statement of the degree to which some portion of the materiel or support system functioned acceptably. For example, such a conclusion might state that "the POI for maintenance personnel did not cover all critical direct support maintenance tasks." In support of each conclusion, the IER team should discuss how data were weighted and combined, the reasons for discarding data (if that happened), how conflicts among data were resolved, and so on.

The foregoing discussion describes procedures for making conclusions about subtest issues. The next step in preparing the IER is to synthesize the subtest conclusions into broader conclusions about each major test issue. The procedures for doing this are similar to those described for subtests. That is, subtest issue conclusions are assessed for reliability and validity; numerical or verbal weights are assigned to each subtest conclusion. If the subtest conclusions conflict, then the use of non-OT data to resolve the conflict is considered. Estimates are made of the risk of using any particular subtest conclusions to form conclusions about a major test issue; the subtest conclusions are then combined to form one or two concluding statements about each major test issue. Such a conclusion might be "system operators can be effectively trained using only low fidelity mock-ups followed by a short training session on actual equipment."

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As a final step in summarizing the OT data and the IER conclusions, the IER team should prepare a statement encompassing all the training and personnel issues. This statement should present the relationship among the major test issues, differences in importance among test issues, and differences in the strength of supporting evidence. Potential trade-offs between excess capability in one area and shortfalls in other areas should be discussed. If plans have been made to collect additional data on personnel or training issues, the probable impact of these data should be considered.

Finally, the IER team should prepare a statement of the overall operational effectiveness of the training system and of personnel selection criteria after taking all considerations into account. This statement should be reduced to a paragraph that is the clearest and briefest statement possible. ·

After the OT position has been completely developed, the IER is assembled for coordination and concurrence within TRADOC. Prior to this, an executive summary suitable for general officer review should be prepared.

INPUT DATA/EVENT DATA BASE

a.   OT Test Report (TR)

   Description: A report describing the test conditions and the findings resulting from the test. Test conditions and findings are described for each subtest issue. The report may contain descriptive data that have been subjected to statistical analysis.

   Data Source: The Test Report is prepared by the test director. For major systems this is OTEA; for non-major systems test findings are reported by the designated DT/OT tester.

   When Available: About one month after the OT.

   Access Procedure: Request from OTEA or other designated tester.

OUTPUTS AND END PRODUCTS

a.   Description: The Independent Evaluation Report (IER) contains conclusions about each of the major issues examined during an OT, including operation, training, and personnel test issues.

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b. <u>Output Usage</u>: The TRADOC IER is used to revise training requirements and plans as well as estimates of personnel requirements. The IER also provides inputs used to prepare a preliminary QQPRI (B15) and to conduct a CTEA/COEA study (B24). It also provides some of the data used when preparing human performance standards (B21) and training criteria (B22).

c. <u>Availability Requirements</u>: Should be completed about two months after the OT is finished.

REFERENCES

TRADOC Regulation 350-2, Training: Development, Implementation and Evaluation of Individual Training
TRADOC Circular 351-8, Individual and Collective Training Plan for Developing Systems: Policies and Procedures.

EXAMPLES AND ILLUSTRATIONS

Example IV-1 shows the format for an IER prepared by the operational tester. See Annex A for example.

TITLE PAGE

EXECUTIVE SUMMARY
1. Purpose and scope
2. Test Item
3. Adequacy of testing
4. Operational test limitations
5. Operational issues
6. Major findings
7. Other findings
8. Conclusions

SECTION 1.0 GENERAL
            Authority
            Purpose and scope
            Data sources
            Background
            Adequacy of operational testing
            Threat

SECTION 2.0 OPERATIONAL TEST ANALYSIS
            Operational issue analysis
            Item tested
            Operational test (OT I, II or III) description
            Evaluation of operational issues

SECTION 3.0 PERFORMANCE ISSUES
SECTION 4.0 LOGISTIC SUPPORT ISSUES
SECTION 5.0 RELIABILITY, AVAILABILITY AND MAINTAINABILITY
SECTION 6.0 SURVIVABILITY ISSUES
SECTION 7.0 TRAINING ISSUES
SECTION 8.0 ORGANIZATION ISSUES
SECTION 9.0 CONCLUSIONS

APPENDIX A   FUTURE TESTING REQUIREMENTS
BIBLIOGRAPHY
ABBREVIATIONS AND ACRONYMS
OPERATIONAL ISSUE INDEX

        Example IV-1. Typical Independent Evaluation Report Format

8. EVENT B8--DEVELOP ISSUES FOR FURTHER TEST

OVERVIEW

Purpose. This event identifies personnel and training issues
that should be examined during OT II or in studies prior to OT II.

Relation to LCSMM/IPS Events. The issues identified during Event
B8 should be incorporated into the Acquisition Plan (B24). When the
issues are particulaly important, they could become the topic of spe-
cial personnel or training studies during later portions of the
Validation Phase.

TSM/POC Responsibilities. The TSM/POC is responsible for coor-
dinating the development of further test issues related to those ele-
ments of the Test Support Package provided by the combat
developer/trainer.

Phasing. Event B8 should begin as soon as the Independent
Evaluation Report is completed and should be finished within one
month.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B8

During OT I it is quite probable that certain test issues related
to personnel and training cannot be assessed adequately. Prototype
training devices may not be available for testing. Soldiers made
available for training may have different background characteristics
than those predicted for the soldiers who will eventually operate or
maintain the system. The test may involve a single piece of equip-
ment, so test issues related to crew training cannot be evaluated.

One of the purposes of OT I is to identify deficiencies in the
training and personnel support package; means for eliminating these
deficiencies should be tested during OT II. As the result of both DT
and OT I, changes in the materiel might be recommended; each change
must be examined in terms of its impact on training and personnel
requirements. Also as a result of OT I, changes might be made in the
operational concept of the materiel; the impact of these changes on
training/personnel requirements may warrant assessment during OT II.

To accomplish Event B8:

a.   Prepare a list of personnel and training deficiencies iden-
     tified during OT I. Determine how each deficiency should be
     corrected and then decide whether these corrective proce-
     dures need to be subjected to test during OT II.

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b. Prepare a list of personnel/training issues that were not
    tested during OT I. Select those issues critical to mission
    success, and identify them as issues to be tested during
    OT II.

c. Review the Test Report prepared by the materiel developer and
    determine whether major materiel changes have been recom-
    mended. If so, for each change, determine whether the pro-
    posed change will result in a different allocation of
    functions and tasks to equipment operators and support
    personnel. If this is the case, estimate the impact of the
    changes on personnel/training requirements. Identify as a
    test issue impact areas that seem critical to mission
    accomplishment, those that seem to involve high-risk training
    tasks, and those for which the impact on training/personnel
    requirements is not known.

INPUT DATA/EVENT DATA BASE

a. DT/OT I Test Report. A report describing the test condi-
    tions and the findings of DT/OI I (the output of Event B6).

b. Independent Evaluation Report prepared by TRADOC. A report
    containing conclusions about each of the issues examined
    during OT I (the output of Event B7).

OUTPUTS AND END PRODUCTS

a. Description: A list of training and personnel issues that
    should undergo further tests either during OT II or as part
    of personnel/training studies prior to OT II.

b. Output Usage: Used to prepare training portion of
    Acquisition Plan (B24) and training/personnel inputs to OT II
    test plan.

c. Availability Requirement: Should be available within 2 months
    following completion of IER.

REFERENCES

TRADOC Regulation 350-2, Development, Implementation, and
                           Evaluation of Individual Training

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9.   EVENT B9--VERIFY/REVISE TASK LIST

OVERVIEW

Purpose. Training provided prior to or during OT I is based on a
list of critical tasks first developed during Events A2 and A6 and
updated on the basis of TASA data provided by the contractor. This
task inventory must be verified, and revised, as appropriate, and a
final determination made regarding the tasks to be selected for
training.

Relation to LCSMM/IPS Events. Event B9 is based on the OT I fin-
dings and on the recommendations contained in the IER. The output of
Event B9 is used to update the OICTP and to provide a data base for
use during preparation of the preliminary QQPRI.

TSM/POC Responsibilities. The training proponent verifies and
revises the task listings. The TSM/POC coordinates this activity.

Phasing. Event B9 should begin as soon as the IER is completed
and should be finished within two months. Events B9, B10 and B11
should be done currently.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B9

Events B2 and B3 resulted in updated lists of critical tasks.
Methods for training personnel to perform these tasks are developed
(usually by the contractor) and assessed during OT I. It is quite
likely OT I will indicate that certain critical tasks were not ini-
tially identified while other tasks included in the first list
actually were not critical.

Before OT I decisions are made on allocation of tasks between
operator and support personnel   OT I findings may demonstrate that
certain tasks should be re-allocated to different operator/maintenance
personnel.

As already noted, certain changes in materiel design may be
recommended as the result of DT I. Each of these changes must be exa-
mined with respect to the impact on the task performance requirements
for operator and maintenance personnel.

The procedures for accomplishing Event B9 are similar to those
described for Event A6, Task Listing. They involve the following
steps:

a. Review task inventory originally developed for each operator
    and support position. Determine whether the approved IER

recommends changes in task allocation, performance require-
ments, and so on for any of these tasks.

(1) Determine whether IER has identified an additional list
of tasks that should be considered as high-risk. In
most instances these will be tasks originally judged
to be low-risk tasks but which, in preparation for
the OT, were found to be difficult to teach.

(2) Based on updated information about the tasks performed
by each operator and maintenance position, review
the task inventories and the reasons for selecting
the tasks for training. Using task selection
procedures/criteria in TRADOC Pamphlet 351-4, revise
as appropriate the list of tasks selected for training.

b. Identify changes to be made in materiel and in operational
concepts. For each of these changes,

(1) Identify those job positions that are affected by the
proposed changes.

(2) Determine whether changes in duty/task assignments will
result from these changes.

(3) Develop new or modified task inventories to reflect the
impact of the intended changes.

(4) Perform a rough TASA for new tasks added to the inventory
and identify those that are mission-critical, high-risk
training tasks. Add those to the list of tasks already
selected for training.

c. Identify additions or deletions to the list of collective and
tactical tasks as developed by the TRADOC combat developer
proponent.

d. Prepare an integrated list of individual, collective, and
tactical tasks for each duty position so that both the
materiel and training developers will have a common task
list.

INPUT DATA/EVENT DATA BASE

a. DT/OT I Test Report

b. Independent Evaluation Report

OUTPUTS AND END PRODUCTS

a. <u>Description</u>: A revised inventory of tasks for each operator
   and maintenance position. Those high risk tasks selected
   for training will be identified and brief documentation
   provided to explain the reason(s) for their selection.

b. <u>Output Usage</u>: Used to prepare the Individual and Collective
   Training Plan and as inputs for the preparation of a prelimi-
   nary QQPRI.

c. <u>Availability Requirement</u>: Should be available within two
   months after the OT IER is completed.

REFERENCES

   TRADOC Pamphlet 350-30 Interservice Procedures for Instructional
                           System Development
   TRADOC Pamphlet 351-4, Job and Task Analysis Handbook

10. EVENT B10--VERIFY PERSONNEL CRITERIA

OVERVIEW

   <u>Purpose</u>. During Event B5 personnel selection criteria were iden-
tified for operator and maintenance positions. The purpose of Event
B10 is to verify these criteria and to amend them if necessary.

   <u>Relation to LCSMM/IPS Events</u>. This event should occur con-
currently with Events B9 and B11 and should be carried out by the same
persons.

   <u>TSM/POC Responsibility</u>. The TSM/POC has responsibility for coor-
dinating the activities of proponent school personnel as they
accomplish this event.

   <u>Phasing</u>. Concurrently with Event B9.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B10

   Beginning in Event A4 (Identification of Personnel Requirements)
and continuing through Event B2 (Contractor-Furnished TASA), Event B3
(Personnel Task/Skill Evaluation), and Event B5 (Personnel/Training
Factors Criteria), estimates were made of the personnel requirements
that should be met by operator and support personnel for the new
equipment. For those high-risk tasks covered during training for OT

I, estimates were made of the mental, physical, skill/knowledge, and attitudinal prerequisites for those tasks. During OT I data were collected on the personnel characteristics of soldiers assigned as OT I test players. Training records for these persons also are maintained.

The OT test report and the IER should contain the following types of information for OT I participants: classification test scores, age, time in service, formal education, military schooling, expressed job interests, and so on. The test report and IER also should contain the training records for OT I operators and maintenance personnel, to include the portion of operators/mechanics who failed to complete various aspects of their training for OT I and the observed reasons for such failures. During OT I training and test information should be developed from key personnel (instuctors, senior NCOs, and officers) regarding the attributes that seem to distinguish highly proficient personnel from less proficient personnel. This and any other relevant data should be used to verify and/or revise the personnel selection criteria established for OT I. Special emphasis should be given to a study of the reasons why certain persons failed or passed with exceptional ease portions of the OT training program. When possible, failures should be attributed either to deficiencies in the training material or approach or to personnel factors.

Personnel criteria established for OT I should be examined to determine whether those persons who just met or did not quite meet personnel selection criteria still learned to perform proficiently. There is a tendency to establish personnel criteria that are too high or too restrictive. Training data and the comments of key personnel should be used to judge whether personnel selection criteria might be lowered.

INPUT DATA/EVENT DATA BASE

a. DT/OT I Test Report

b. Independent Evaluation Report

OUTPUTS AND END PRODUCTS

a. Description: An updated set of personnel selection criteria for each duty position associated with the new system.

b. Output Usage: Provides input for preparing of the preliminary QQPRI and updating the OICTP.

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c. <u>Availability Requirements</u>: Should be available within two months after completion of the TRADOC IER Report.

REFERENCES

AR 71-5, Introduction of New or Modified Systems/Equipment
    (to be replaced by AR 350-XXX)
AR 70-1, Training Device Development
TRADOC Circular 350-3, Individual/Collective Training and
                       Development Glossary (TBP)
TRADOC Circular 351-3, Individual Training Plan (TBP)
TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRADOC Circular 351-5, SQT Policy and Procedures
TRADOC Circular 351-8, Individual and Collective Training
                       Plan for Developing Systems:
                       Policies and Procedures
TRADOC Circular 351-XXX, Collective Training Plan (TBP)
TRADOC Pamphlet 350-30 Interservice Procedures for
                       Instructional System Development
ARI-TR-78-A7, <u>TSM Guide to Training Development and
               Acquisition of Major Systems</u>
Reference Letter, ATTSC-DS-DPA, 6 February 1979, Subject:
               Standard Training Paragraphs for
               Requirements Documents and Operational
               Test Training Issues
Braby, R., et al., <u>A Technique for Choosing Cost-Effective
               Instructional Delivery Systems</u>
DARCOM-TRADOC, Technical Documentation and Training Acquisi-
               tion Handbook

11. EVENT B11--VERIFY TRAINING REQUIREMENTS

OVERVIEW

<u>Purpose</u>. This activity is a continuation of Event B9, in which tasks were selected for training. In Event B11, training requirements for each task are prepared or updated.

<u>Relation to LCSMM/IPS Events</u>. This activity should be accomplished concurrently with Events B9 and B10 and should be performed by the same personnel.

<u>TSM/POC Responsibilities</u>. Event B11 is accomplished by the training proponent and is coordinated by the TSM/POC for the system.

<u>Phasing</u>. This event should be completed within two months after the IER is finished.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B11

The Task and Skill Analysis provided by the contractor (B2) fur-
nished a task inventory for each duty position. Certain tasks within
each of these inventories were identified as high risk tasks for which
training material was developed. As noted during the discussion of
Event B9, the task inventory developed for each job position must be
verified and revised in accordance with OT I test results and espe-
cially in accordance with changes in the materiel design and/or system
operational concepts.

In preparation for OT I, breadboard and storyboard systems were
developed to support high-risk tasks. The effectiveness of this
material, including draft TMs, training devices, and SPA material, was
examined during OT I. It can be expected that this examination indi-
cated that certain portions of the draft training material were accep-
table while other portions were not. Also, it may be determined that
certain training was unnecessary and/or that training should be
required for certain tasks that, prior to OT I, were judged to be low-
risk tasks.

During Event B11 representatives of the training proponent should
examine each task selected for training during Event B9 and

a. Update the training standards;

b. Decide whether SPA/TEC material can substitute for
    institutional training.

Particular attention should be given to the development of
training requirements for any new individual, collective, or tactical
tasks added to the inventory of tasks selected for training (B9).
Procedures for preparing those specifications were discussed under
Events A3 (page III-10) and Event A7.1 (page III-31), and can be found
in TRADOC Pamphlet 350-30.

INPUT DATA/EVENT DATA BASE

a. DT/OT I Test Report.

b. Independent Evaluation Report.

OUTPUTS AND END PRODUCTS

a. Description: For each duty position an updated list of indi-
    vidual and collective tasks selected for training along with

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a statement of the training standards for each task. This information can be combined with the output of Event B9.

b. Output Usage: Used to update the OICTP, and to provide inputs for preparation of the preliminary QQPRI.

c. Availability Requirement: Should be available within two months after the TRADOC IER Report is completed.

REFERENCES

Same as for Events B10, page IV-35.

12. EVENT B12--UPDATE DRAFT ICTP

OVERVIEW

Purpose. During Event B12 the OICTP developed during the Concept Phase is updated and refined. The ICTP "identifies the elements of the training subsystem, developed separately, and coordinated and available for testing/validation during OT II. The ICTP provides training developers and staff elements with: (1) a management tool to insure a complete training package is developed; and (2) a reference document for use in preparing and supporting the basic system decision making, programming, and planning processes and sequences" (TRADOC Circular 351-8).

Relation to LCSMM/IPS Events. The updated draft ICTP provides the information needed to update the training support estimates and the ICTP (B17), provides inputs to the CTEA, and furnishes much of the training information to be incorporated into the ROC/LR (B20). Also, the ICTP provides implementation schedules for all subsequent training activities in the materiel acquisition process.

TSM/POC Responsibilities. The proponent school/training developer prepares the updated ICTP, obtaining inputs from the materiel developer and from the LOGCEN, ADMINCEN, and other appropriate agencies.

Phasing. The ICTP must be submitted along with the ROC/LR. It should be prepared in draft form at least 4 to 6 months before this submission, so that its contents can be used by the materiel developer in preparing the preliminary QQPRI (B15) and the tentative Basis of Issue Plan (B16).

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B12

Policies and procedures for preparing an OICTP/ICTP are discussed in TRADOC Regulation 350-2 and TRADOC Circulars 351-8 and 351-XXX. The general procedures for preparing an OICTP were reviewed under Event A7.1 (page III-31).

As the result of Event A7.1 plans were prepared for providing training for each officer and enlisted duty position associated with the operation or support of the new materiel. DT/OT I and the evaluation and verification events that follow (B7, B9, B10, and B11) will have resulted in various changes in training requirements. The information about training requirements available at this point is considerably more detailed than that available during preparation of the initial OICTP (A7.1).

The updated ICTP should incorporate all known training requirements, including resident, unit, and extension training, for all operator and maintenance positions. Requirements for new equipment training and training for introducing the new equipment to operational units should be included (AR 350-xxx). These requirements will be specified by the materiel developer (see Event B17) and will include requirements for contractor/materiel developer training for service school staff and faculty.

During preparation of the ICTP, special consideration should be given to the use of job training packages (JTP). "The JTP is guidance for the training required to qualify an individual in a field environment for a duty position within a specific MOS" (TRADOC Circular 351-8). JTPs can form the basis for self-study programs at institutions and can be integrated into Soldier's/Commander's Manuals.

The procedures for updating the OICTP are as follows:

a. Examine each duty position within an MOS:

    (1) Modify the existing training plan in light of verified training requirements.

    (2) Verify/establish the need for specific training subsystem elements (training devices, SPA material, TEC material, etc.) to support the training plan.

    (3) Add or delete training requirements on the basis of data developed during Event B11 and modify training plans accordingly.

    (4) For each ITP verify/identify probable training setting, training form, and training media (see TRADOC Circular 351-4.

b. Examine IER and output from Event B9 to identify changes in collective tasks.

    (1) Expand and refine Unit CT (Collective Training) and CT support requirements.

    (2) Expand and refine CT concept for institutional and unit training, to include training for trainers and training managers.

    (3) Identify and/or expand/refine training requirements for Opposition Force Personnel (OPFOR) and for battle simulation and command and staff training.

    (4) Identify and/or expand/refine requirements for crew/team training. Identify need for training package for high-risk collective tasks.

    (5) Develop plans for identifying CT training objectives, CT training hierarchy, CT support materials, and CT test material (draft ARTEP).

c. Information and plans developed on the basis of Steps 1 and 2 above should be organized into an Individual Training Plan and a *Collective Training Plan*. Each of these plans should be sub-divided into institution training, unit training, and TEC training. Tables should be constructed to show, for the Individual Training Plan, the MOSs by skill level that will be trained at the school level, at the unit level, and through self-training (TEC, SPA/ETM, or ACCP material). Similarly, the Collective Training Plan should be organized to show, by MOS and skill level, the training to be conducted at the school level and at the unit level. For each MOS/skill level line item of the individual and of the collective training plan, there should be an indication of the use of new or revised training courses and material (SPA/ETM, ACCP, SM/CM, etc.). The role of training devices, SQTs, and ARTEPS should also be indicated.

d. A tentative implementation schedule should be prepared for both the individual and the collective training plan. In addition, milestone schedules should be developed for each of the training system elements required in support of the training plan, including:

    (1) Schedules for institutional courses (both new and add-on)

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(2) Correspondence courses (both new and add-on)

    (3) Training equipment requirements

    (4) Training aids and instructional media requirements

    (5) Training literature requirements

    (6) Training device requirements

    (7) Doctrinal, maintenance, and training or other
        publication/media requirements (new or revised)

    (8) Opposing force (OPFOR) training requirements.

e. To complete the updated OICTP, support elements for imple-
    menting the training plan must be identified. The require-
    ments for new equipment training (NET) must also be
    developed. General procedures for updating training support
    requirements are discussed under Event B13, and general
    procedures for developing NET plans under Event B17.

INPUT DATA/EVENT DATA BASE

a. Independent Evaluation Report--see outputs description for
    Event B7 (page IV-26).

b. Verified/revised list of tasks selected for training--see
    output description for Event B9.

c. Verified personnel selection criteria--see description of
    output for Event B10 (page IV-35).

d. Verified/revised training requirements--see output descrip-
    tion for Event B11 (page IV-37).

OUTPUTS AND END PRODUCTS

a. Description: A document describing the plans for developing
    all elements of the individual and collective training pack-
    ages needed in support of the new equipment. (See Example
    III-2, page III-37).

b. Output Usage: Provides inputs to all subsequent training
    activities; provides training information for incorporation

into the Preliminary QQPRI (B15), the ROC/LR (B20) and the Acquisition Plan (B24).

c. <u>Availability Requirement:</u> Must be completed prior to pre-paration of preliminary QQPRI (B15).

REFERENCES

Same as for Event B10, page IV-35. .

EXAMPLES AND ILLUSTRATIONS

Example III-2, taken from TRADOC Circular 351-8, outlines the contents of an ICTP (see page III-37).

13.   EVENT B13--UPDATE TRAINING SUPPORT PLAN

OVERVIEW

<u>Purpose.</u> During this event the training support plan (TSP) pre-pared during Event B4 is updated. The TSP identifies the training, logistic requirements, instructors and facilities, and other support requirements needed to implement training on a continuous basis. It contains developmental milestones and tentative schedules for all training subsystem elements, such as SPA/ETM material, training devi-ces, and Soldier's and Commander's Manuals. In addition, the TSP describes requirements for new equipment training (B17).

<u>Relationship to LCSMM/IPS Events.</u> Event B13 is a continuation of Event B12. The output of this event is used to prepare the PQQPRI (Event B15) and is updated during Events B17-B19. Information deve-loped during B13 provides inputs to the Validation Phase CTEA/COEA study and is incorporated into the ROC (B20) and into the Acquisition Plan (B24).

<u>TSM/POC Responsibilities.</u> The TSM/POC coordinates the prepara-tion of the training support plan. The proponent school prepares the plan. Inputs are obtained from the LOGCEN school, the ADMINCEN school, and from the materiel developer.

<u>Phasing.</u> This event should begin as soon as Event B12 is finished and should be completed in time to provide inputs to the pre-paration of the preliminary QQPRI (B15).

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B13

The contents of an OICTP/ICTP, and in particular the support requirements addressed in this document, are described in TRADOC Circular 351-8 and are outlined in the format illustration provided in Example III-2 (page III-37) of this handbook. The general procedures for preparing a training support plan are discussed in this handbook under Event A7 (page III-40). During Event B13 the training support requirements contained in the original OICTP are updated. The general steps for accomplishing this are as follows:

a. Review changes that have been made in the individual and the collective training plans (output of B12). For each change, study the original estimates of support requirements and revise or delete these requirements as appropriate.

b. Identify new training requirements, not covered in the original OICTP. For each of these new requirements, develop estimates of support requirements, using general procedures described under Event A7 (page III-40) of this handbook.

c. For both the individual and the collective training plans, estimate the following requirements by MOS and skill level: facilities, supplies and training material requirements, staff training requirements for training soldiers for OT II. These estimates should cover both the preparation for and the conduct of institutional training. Forward estimates of staff training requirements to the materiel developer for use in preparing new equipment training plans.

d. For both the individual and the collective training plans, develop rough estimates of logistic requirements (POL, administration/billeting, office supplies, repair parts, expendables). Forward this information to the LOGCEN school for verification and refinement of the estimates.

e. Develop cost estimates for each support equipment in accordance with procedures contained in AR 71-5 and/or AR 350-XXX.

f. Prepare fairly detailed summary statements to describe each of the support requirements discussed in Section C-7 of the OICTP. (See illustration for Event B12.)

INPUTS DATA/EVENT DATA BASE

a. Detailed individual and collective training plans organized by MOS and skill level.

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Description: See Event A7.1 (page III-31), and Event B12.

Data Source: Proponent school.

When Available: Should be available approximately six months prior to submission date of Required Operation Capability (ROC) (Event B20).

Access Procedure: Request from proponent school.

OUTPUTS AND END PRODUCTS

a. Description: A detailed individual and collective training support plan covering institutional, unit, and TEC training. Cost estimates and implementation/development schedules should be provided. Plans for new equipment training should be included. Information and schedules should cover the period from about three months prior to OT II through five years after IOC (Initial Operational Capability, Event D5).

b. Output Usage: Provides inputs for the preparation a preliminary QQPRI (B15) and a complete ICTP (B17).

c. Availability Requirement: Should be available one month before the scheduled preparation of the PQQPRI.

REFERENCES

TRADOC Regulation 71-12, Total Systems Management -
                        TRADOC System Manager (TSM)
TRADOC Circular 351-8, Individual and Collective Training
                        Plan for Developing Systems: Policies
                        and Procedures
TRADOC Pamphlet 350-30, Interservice Procedures for In-
                        structional System Development,
                        Volumes 1 and 2
DARCOM-TRADOC, Technical Documentation and Training
                        Acquisition Handbook
ARI-TR-78-A7, TSM Guide to Training Development and
                        Acquisition of Major Systems
Local (Proponent School) policy/SOPs for calculating
        instruction, facility, etc., requirements

EXAMPLES AND ILLUSTRATIONS

See Example III-2, page III-37.

14. EVENTS B14 and B15--PROVISIONAL QUALITATIVE AND QUANTITATIVE
PERSONNEL REQUIREMENTS INFORMATION (PQQPRI)

OVERVIEW

Purpose. The purpose of the Provisional Qualitative and
Quantitative Personnel Requirements Information (PQQPRI) is to provide
as much as possible of the following personnel information to the
decision authorities at Milestone II:

a. Equipment to be operated and maintained, to include supporting
special test ¬·ipment.

b. Direct Annual Maintenance Man-Hours (AMMH) by MOS/SSI for
each level of maintenance (organizational, DS/GS).

c. The number of direct operators required to crew or operate
the system.

d. List of duty positions by MOS and title with duties and tasks
for each.

e. Requirements for MOS/SSI.

f. Any contractor Identified Training Programs (ITP).

Relationship to LCSMM/IPS Events. The provisional QQPRI is deve-
loped from data provided during the analysis of personnel-related test
issues examined in OT/DT I, from updated estimates developed during
Event B14, and from the updated Training Support Plan, Event B13.
Event B14 addresses only the training issues. The Logistic Support
Analyses performed by the materiel developer, not shown on the IPS
chart, provide the remaining data input requirements. Events B14
and B15 are the same as Event 26 of the LCSMM.

TSM/POC Responsibilities. DARCOM or other materiel developer
will prepare the PQQPRI and send it through AMRSA to HQ TRADOC with
information copies to MILPERCEN and other appropriate agencies. HQ
TRADOC will task proponent schools for updated and refined require-
ments for training support planning to use as input to the PQQPRI.
Based on the results of OT/DT I and other personnel studies, the pro-
ponent schools will provide comments and recommendations for revisions
through the TSM to HQ TRADOC with information copies to ADMINCEN and
LOGCEN. These activities are coordinated by the TSM.

Phasing. The provisional QQPRI will be submitted by the materiel
developer to the combat developer concurrently with DA Form 3362b-R,
Basis of Issue Plan Feeder Data (B16) as soon as possible after eva-
luation of the personnel test results of OT/DT I.

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GENERAL PROCEDURES FOR ACCOMPLISHING EVENTS B14, B15

Event B14 is an information-gathering activity and is the first step in the preparation of a PQQPRI in Event B15. Event B14 involves obtaining all available information on qualitative and quantitative requirements for personnel. Information about required duties and tasks, MOS and skill level requirements, and special personnel qualification requirements should be available from the outputs of Event B9 (Verify/Revise Task List) and Event B10 (Verify Personnel Criteria). Performances and training standards should be described in the outputs of Event B11 (Verify Training Requirements) and in the updated draft ICTP (B12). Numbers of required personnel should be described in the draft ICTP (B12) and in the Training Support Plan (B13). Supplementing these sources of information are data developed or verified during the evaluation of contractor-generated personnel and task/skill data (Event B3).

The general requirements for preparation of the provisional QQPRI are presented in AR 611-1, Chapter 3. The materiel developer is responsible for preparing the PQQPRI, with input from the combat developer and trainer. Though the TSM/POC is responsible for the coordination of the information required by the materiel developer from both the combat developer and the trainer, only the trainer's role will be addressed here.

The trainer will review the logistic support analysis data supplied by the materiel developer, and provide the information necessary to project MOS/SSI and training requirements. This information includes an estimate of the amount of formal or on-the-job training required in the proposed or revised MOS/SSI(s). Subject matter will be listed by broad categories, showing the scope of instruction and the approximate number of hours of training required.

This information is obtained from the trainer's review of the results of the personnel test issues examined in OT/DT I and his comparison of these results with the MOS requirements originally postulated during the evaluation of critical tasks, Events A6 through A8. These comparisons are performed in Events B7 through B11, and the resulting recommendations are forwarded to the materiel developer for incorporation in the PQQPRI.

INPUT DATA/EVENT DATA BASE

a. Updated Training Support Plan

   Description: A detailed individual and collective training
   support plan covering institutional, unit, and TEC training.

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Cost estimates and implementation/development schedules should be provided. Plans for new equipment training should be included. See Output of Event B13.

Data Source: Training Developer

When Available: As developed.

Access Procedure: Request from Proponent School

b. Personnel Training Input

Description: A verified list of tasks to cover during training (B9 output); verified personnel criteria (B10 output); and verified training requirements (B11 output).

Data Source: Training Developer

When Available: As developed.

Access Procedure: Request from Proponent School

c. Logistic Support Analysis

Description: See DARCOM Logistic Support Analysis Record

Data Source: Materiel Developer

When Available: As developed.

Access Procedure: Obtain from PM

OUTPUT AND END PRODUCTS

a. Description. A preliminary QQPRI and a DA Form 33626-R.

b. Output Usage. Used to prepare tentative Basis of Issue Plan (BOIPT)

c. Availability Requirements. About six months prior to submission of ROC/LR (Event B20).

REFERENCES

AR 71-2, Basis of Issue Plans
AR 611-1, MOS Development and Implementation

EXAMPLES AND ILLUSTRATIONS

a.   A sample transmittal letter is shown as Example IV-2.

b.   Form 3362B is shown as Example IV-3.

15.   EVENT B16--BASIS OF ISSUE PLAN, TENTATIVE (BOIPT)

OVERVIEW

Purpose.   The purpose of the Tentative Basis of Issue Plan is to
provide an initial estimate covering the planned placement of a new
item of equipment and anticipated personnel changes, as indicated by
the requirements document or QQPRI in the appropriate TOE(s), AR 71-2.
It is used to inform all participants in the materiel acquisition pro-
cess of the planned placement of the system and provides HQDA with
essential information required for initial planning and programming
computations in the Structure and Composition System (SACS).

Relation to LCSMM/IPS Events.   The BOIPT, Event B16, is developed
from the PQQPRI, Event B15, and from the analysis of the unit struc-
ture.   It is Event 27 in the LCSMM.

TSM/POC Responsibilities.   TRADOC, as the Army's principal combat
developer, develops, reviews, updates, and coordinates the BOIPT on
equipment proposed to enter the Army supply system and forwards the
results of these actions to HQDA.   The TSM, as TRADOC representative
for the system, is the primary source for basic information required
in the BOIPT for that system.

Phasing.   A copy of the BOIPT will be submitted concurrently with
the requirements document, ROC or LR.   Input to the BOIPT comes from
the PQQPRI supplied by the materiel developer and must be staffed by
all parties within TRADOC involved in the specific acquisition pro-
cess.   Since such staffing and approval of any comments and changes
requires some time, appropriate lead time should be allowed prior to
the required submission date of the requirements document.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B16

The BOIPT is an integral part of the ROC or other requirements
document.   It is prepared and submitted by TRADOC to HQDA (DAMO-RQR)
in support of all new systems.   It is based on input gathered on per-

DRSAR-MAF-NW

1 6 JUL 1979

SUBJECT: Final Qualitative and Quantitative Personnel Requirements Information (QQPRI) - Computer Set, Field Artillery, Missile; and Computer Set, Field Artillery

Commander
US Army DARCOM Maintenance Management Center
ATTN: DRXMD-MS
Lexington, KY 40507

1. Subject final QQPRI is forwarded in 13 copies in accordance with AR 611-1.

2. Attachments include the following:

    a. Preliminary Maintenance Allocation Chart.

    b. Basis of Issue Plan Feeder Data, DA Form 3362b-R.

    c. DARCOM Form 1283, New Equipment Training Plan (NETP).

    d. Section V of Acquisition Plan.

FOR THE COMMANDER:

1 Incl.
as (13 copies)

J. W. MONTGOMERY
Chief, Fielding and Training Branch

Example IV-2. Sample Transmittal Letter for QQPRI

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| BASIS OF ISSUE PLAN FEEDER DATA
For use of this form, see AR 71-2;
the proponent agency is ODCSOPS. | | 1. BOIP PLAN NO. | 2. ☐ INITIAL
☐ INTERIM
☐ FINAL | 3. PREPARATION DATE |

4. DESCRIPTION		5. EST TC DATE		6. EST AVAIL DATE	
		QTR	FY	QTR	FY
a. GENERIC					
b. NATIONAL					

7. LINE ITEM NUMBER				8. NATIONAL STOCK NO.
a. DEV	b. STD	c. RRICC	d. SSN	

9. DESCRIPTION

10. PRIMARY USAGE (Non-Technical Description of Major Uses)

11. ASSOCIATED ITEMS (Use blank sheet if additional space req'd)				
LINE ITEM NO. (a)	NOMENCLATURE (b)	CC/SICC (c)	STD/NEW (d)	QTY (e)

12. ITEMS TO BE REPLACED			
LINE ITEM NO. (a)	NOMENCLATURE (b)	COMP OR IN PART (c)	RECOM TC/RTC (d)

13. DA APPROVED STATEMENT OF REQUIREMENT (LOA, LR, ROC, TDR, TDLR, Other DA Authority)

14. CARDS REFERENCE NO.	15a. ABA	15b. RRIC	16. EST COST PROD MODEL

17. RDTE PROJECT OR TASK (If Applicable)	
a. NUMBER	b. TITLE

18. REMARKS

19. DEVELOPING AGENCY, LOCATION, FILE SYMBOL AND TELEPHONE NO.	20. TYPED NAME AND TITLE OF PREPARER
	21. SIGNATURE

DA FORM 3362b-R, 1 APR 76

Example IV-3. BOIP Feeder Data Form, 3362b-R

sonnel requirements and unit structures obtained from the materiel developer and combat developer respectively. Each system will have a different resolution of the basic data at the time of submission, but it is imperative for TRADOC to incorporate the latest available information into this submission. To accomplish this, TRADOC (through the TSM) must maintain close liaison with the developers of the basic data and BOIP feeder data.

The materiel developer prepares the PQQPRI and provides it to TRADOC concurrently with the initial DA Form 3362b-R, which contains most, if not all, of the personnel data required for the BOIP. This information should be combined with the information obtained from combat developments on unit structure to prepare the BOIP in accordance with AR 71-2. The tentative BOIP is developed using preliminary estimates. Changes will occur in the BOIP during the Validation Phase on the basis of the results of testing and further evaluation, but this first estimate is important because it forms the basis for DA five-year planning.

The sequence of events relating to the submission of the BOIPT are presented in Figure IV-1 (from AR 71-2).

BOIP-I/Update BOIP-I

Submits the initial/interim DA Form 3362b-R and PQQPRI to TRADOC concurrently during the preparation of LR, ROC or as soon as an item of equipment is identified to satisfy an approved LOA. .

| MATERIAL DEVELOPMENT |

Submits the BOIP (TOE and TRADOC TDA Tng RQR only) to HQDA concurrently with the LR or ROC (with copy to DARCOM (EARA)).

| TRADOC |

Approves, adjusts or disapproves and returns to TRADOC.

| HQDA |

Pub if approved. Provides DARCOM (EARA) and interested activities copies.

| TRADOC |

Figure IV-1. Sequence of Events in BOIPT Submission

Instructions for preparing and revising DA Form 3362b-R, Basis of Issue Plan Feeder Data, are also presented in AR 71-2. It should be noted that, while the BOIP is a critical document in the LCSMM and IPS, it is also a HQDA planning document whose input will have considerable bearing on the overall budget and force structure planning. For this reason it is important to have anticipated training implications that might arise from the introduction of the system and have performed personnel studies and trade-offs to develop solutions.

Each BOIP must contain a statement concerning the rationale or justification considered when the BOIP was prepared or updated. This

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statement should include a summary of the organizational and operational concepts as described in the DA-approved requirements document and the rationale used in the selection of alternatives. This information is not a line-by-line justification but rather a summary of the types of organizations (Infantry, Artillery, Signal, etc.) depicted in the BOIP and why the TOE requirements exist.

INPUTS DATA/EVENT DATA BASE

    a.   PQQPRI

        Description: See Event B15

        Data Source: DARCOM

        Access Procedure: PQQPRI will be prepared by the materiel developer and provided concurrently with the initial Form 3362b-R to TRADOC for use during preparation of BOIP.

    b.   Unit Structure

        Description: This first study examines only the control, maneuver, and organic logistic elements with respect to aggregate strengths and major items of equipment in the type of unit(s) to be affected by the introduction of the new system.

        Data Source: Combat Developer

        Access Procedure: Request from Combat Developer. Latest information should be provided upon receipt of PQQPRI.

    c.   New Equipment Personnel Requirements Summary (NEPRS)

        Description: The NEPRS provides a single source of information on the personnel, training, and organizational implications of all new or modified materiel under development.

        Data Source: MILPERCEN

        When Available: Updated annually.

        Access Procedure: Request from MILPERCEN.

OUTPUTS AND END PRODUCTS

a. _Description._ A tentative plan describing the planned
placement of new equipment items. It includes estimates
of manning requirements.

b. _Output Usage:_ Provides HQDA with information needed for
initial planning and programming computations in the
Structure and Composition System (SACS). Also used as
the basic data for pertinent personnel and unit studies.

c. _Availability Requirement:_ Must be available for sub-
mission as an attachment to the ROC/LR. Information
will be updated during the Development Phase.

The major output of the BOIPT is the information it contains for
HQDA planning. The information will be updated as the Validation
Phase progresses to the Development Phase and will continually be used
as the basic data for pertinent personnel and unit studies.

REFERENCES

AF 71-2, Basis of Issue Plan
AR 71-9, Materiel Objectives and Requirements
AR 310-31, Management System for Tables of Organization
            and Equipment
AR 611-1, MOS Development and Implementation
DARCOM Regulation 11-27, Life Cycle Management of DARCOM
                          Materiel

EXAMPLES AND ILLUSTRATIONS

See Annex A for sample.

16. EVENT B17--PREPARE ICTP/NETP

OVERVIEW

Purpose. Up to this point in the materiel acquisition process,
all iterations of the ICTPs have been in outline form and have been
incomplete. The ICTP prepared during Event B17 accounts for all known
training requirements. This ICTP will provide the information on
training and logistics for incorporation into the ROC and the Acquisi-
tion Plan, and also will provide the basis for the statements of
training requirements contained in the contract for full-scale engi-
neering development.

Relation to LCSMM/IPS Events. Events B17, B18, and B19
correspond to Event 30 of the LCSMM model. The products of these
events provide detailed guidance for most subsequent training activi-
ties in the materiel development process.

TSM/POC Responsibilities. The training proponent is responsible
for the final version of the ICTP. The materiel developer is respon-
sible for preparing the NETP (New Equipment Training Plan). The
LOGCEN school is responsible for identifying and costing the logistic
support required in support of the training plans. The TSM/POC, should
provide coordination and should review the final version of the ICTP
within appropriate mission areas.

Phasing. Event B17 should be complete about one month before
ROC/LR preparation is scheduled to begin.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B17

During this event the training proponent packages already deve-
loped information into the ICTP format. The format for an ICTP is
shown in the Example III-2, page III-37.

As a first step, the requirements for new equipment training
should be obtained from the materiel developer. These requirements
should be described in the form of a New Equipment Training Plan.
It should account for the need to train instructors and key per-
sonnel (I&KP Training Plan), staff planners, OT II players, and per-
sonnel of the units to first receive the new materiel. In addition,
plans should be made for New Materiel Introduction Training, which is
training to brief major commands on the new system.

As a second step, the logistic requirements and costs prepared by
the LOGCEN school should be obtained and incorporated into the ICTP.
These support requirements should cover ammunition, POL, office
supplies, repair parts, etc. at both school and unit levels.

For each major logistic support requirement, subparagraphs should
be prepared detailing the nature of the requirements. Supporting
documents should be appended to the ICTP.

To complete the ICTP, updated statements should be prepared on
the strategy by which the training is to be implemented and on how the
training program is to be structured.

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INPUT DATA/EVENT DATA BASE

a. A revised Outline ICTP (Output from Event B18).

b. An updated Training Support Plan (Output from Event B13).

c. A preliminary QQPRI (Output from Event B15).

OUTPUTS AND END PRODUCTS

a. Description: A complete ICTP containing training plans and support/cost estimates for all known training requirements, to include new equipment training.

b. Output Usage: Provides data required to (1) update CTEA/COEA study conducted during Concept Phase; (2) prepare Sections V and VI of ROC (B20) and Acquisition Plan (B33); and (3) provide basis for statements of training requirements contained in Full-Scale Engineering Development RFP.

c. Availability Requirements: Should be available prior to scheduled beginning of Event B20, Prepare ROC/LR.

REFERENCES

AR 71-5, Introduction of New or Modified Systems/Equipment (to be replaced by AR 350-XXX)
70-1, Training Device Development
TRADOC Circular 350-3, Individual/Collective Training and Development Glossary (TBP)
TRADOC Circular 351-3, Individual Training Plan (TBP)
TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRADOC Circular 351-4, SQT Policy and Procedures
TRADOC CirculaR 351-8, Individual and Collective Training Plan for Developing Systems: Policies and Procedures
TRADOC Circular 351-XXX, Collective Training Plan (TBP)
TRADOC Pamphlet 350-30, Interservice Procedures for Instructional System Development
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition of Major Systems
Reference Letter, ATTSC-DS-DPA, 6 February 1979, Subject: Standard Training Paragraphs for Requirements Documents and Operational Test Training Issues
Braby, R., et al., A Technique for Choosing Cost-effective Instructional Delivery Systems

<u>EXAMPLES AND ILLUSTRATIONS</u>

See Annex A for sample.

17. EVENT B18--REVISE OUTLINE ICTP

<u>OVERVIEW</u>

<u>Purpose</u>. During Event B19 an updated inventory of high-risk and low-risk tasks was developed. For each of these tasks, performance requirements were identified. For new tasks added to the inventory, training or performance support plans were developed. In this event (B18), the preparation of training plans for all tasks selected for training is completed. Essentially this involves updating the training support plans developed during Event B13 to account for those new task training requirements identified during Event B18. In addition, special emphasis is given to the preparation of training device requirements.

<u>Relation to LCSMM/IPS Events</u>. This event is part of LCSMM Event 30. It should be performed concurrently with IPS Events B18, B21, and B22.

<u>TSM/POC Responsibilities</u>. The proponent school will perform the activities surrounding Event B19. In his capacity as a coordinator, the TSM/POC should alert the materiel developer and the LOGCEN school that inputs to the final version of the ICTP (Event B17) will be required by a certain date.

<u>Phasing</u>. Must be completed prior to scheduled date for preparing ICTP/NETP (B17).

<u>GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B18</u>

During this event draft ICTP and training support plans developed during Events B12 and B13 should be updated to account for any new training requirements identified during Event B19. The procedures for accomplishing this are the same as those discussed under Events A7 (page III-40) and B13 (page IV-43). Portions of these procedures also are reviewed in TRADOC Circular 351-8.

Each time an Individual and Collective Training Plan is updated, more detailed information is developed on training device requirements. So far in this handbook, training devices have been discussed as though they were acquired as part of the support package for the materiel system. It has been assumed that the need for training devi-

ces noted in the LOA will be addressed in the ROC (Event B20). This is not always the case, especially for training devices that are different technically from the system they represent (e.g., maintenance and flight simulators).

According to TRADOC Circular 70-1, if a training device for a developing system is a modification or variation of the system itself (nonoperable equipment, inert ammunition, etc.) and does not warrant a separate engineering development, the device requirement can be specified as part of the LOA and the ROC/LR for the system.

On the other hand, if the training device requires training characteristics that are not well defined or involve some technical risk (as does the development of a simulator), then the training device should be treated as a separate developmental effort. In such instances a separate LOA should be prepared for the device, and the device should be identified in the AD Contract as a separate deliverable requiring its own DT/OT I. If at all possible, the device should be ready for assessment during OT I and should be evaluated in the IER.

For a developing system a Training Device LOA (TDLOA) should be jointly prepared by the combat training and the materiel developers. It should outline the basic agreement for further investigation of the potential training device.

Assuming that the results of OT I demonstrate the need for the device and the effectiveness of the brassboard version of the device, a Training Device Requirement/Training Device Letter Requirement (TDR/TDLR) should be prepared at about the same time that the ROC/LR for the developing system is prepared. The ROC should contain justification for the device and outline its developmental schedule and its cost.

As described in TRADOC Circular 70-1, TDLOA and TDR/TDLR are processed like similar documents for development systems--in accordance with AR 71-9 and the LCSMM as outlined in DA Pamphlet 11-25. A modified CTEA is required in support of a TDLOA, and a full-fledged CTEA must be prepared in support of a TDR/TDLR.

If at all possible, the developmental schedule for a training device should parallel that of its parent system. This make it feasible to assess the device as part of OT I and II for the development system.

INPUT DATA/EVENT DATA BASE

a. An updated draft ICTP (from Event B12).

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b.   An updated Training Support Plan (from Event B13).

c.   An updated list of training requirements (from Event B19).

OUTPUTS AND END PRODUCTS

a.   Description: A completely updated training support plan
     minus inputs from the materiel developer and from LOGCEN.
     The plan describes how training on the new equipment will
     be incorporated in CONUS schools, training centers, and
     units world wide. The plan details all training support
     required for the new system. It also describes the
     training required, both individual and collective, for each
     MOS and skill level associated with the system. Five-year
     cost estimates are provided, and developmental milestones
     are presented for all major elements of the training
     subsystem.

b.   Output Usage. Used to prepare the ICTP that must be sub-
     mitted along with the ROC. Most of the materiel developed
     during this event and during Event B19 will be attached as
     supporting appendices to the ICTP.

c.   Availability Requirement: One or two months prior to pre-
     paration of the ROC.

REFERENCES

     AR 71-5, Introduction of New or Modified Systems/Equipment,
              to be replaced by AR 350-XXX)
     AR 70-1, Training Device Development
     TRADOC Circular 350-3, Individual/Collective Training and
                            Development Glossary
     TRADOC Circular 351-3, Individual Training Plan
     TRADOC Circular 351-4, Job and Task Analysis
     TRADOC Circular 351-5, SQT Policy and Procedures
     TRADOC Circular 351-8, Individual and Collective Training
                            Plan for Development Systems:
                            Policies and Procedures
     TRADOC Circular 351-XXX, Collect Training Plan
     TRADOC Pamphlet 350-30, Interservice Procedures for Instruc-
                            tional System Development
     Hanson, V. L. and Purifoy, G. R., Jr., TSM Guide to Train-
          ing De.elopment and Acquisition for Major Systems. ARI
          Technical Report TR-78-A7, U.S. Army Research Institute
          for the Behavioral and Social Sciences, Alexandria, VA,
          March 1978

Training Device Requirements Document Guide: A Procedures
Handbook for Directorate of Training Developments
Project Offices for Devices(DTDPOD). PM TRADE, Naval
Training Equipment Center, Orlando, FL, and Army
Training Support Center (ATSC), Ft. Eustis, VA,
January 1979

18. EVENT B19, B18--OT DATA ON TRAINING /REVISE OUTLINE ICTP

OVERVIEW

Purpose. As the result of OT/DT I, numerous changes may be made
in the materiel design and in the tactical and logistic support con-
cepts for the equipment. OT I may also have demonstrated a need for
changing certain training concepts and for modifying the list
of high-risk tasks selected for training. During Event B19, the final
inventory of tasks selected for training is developed. This inventory
reflects changes in training requirements resulting from OT/DT I.
During Event B18 the OICTP is updated on the basis of this new task
listing.

Relation to LCSMM/IPS Events. Events B19 and B18 are critical
events in that they provide the latest information available on
training requirements. This information forms the basis for the ICTP
prepared during Event 17, which then is is incorporated into the ROC
(Events B20 and 31 of the IPS and LCSMM models, respectively).

TSM/POC Responsibilities. The training proponent is responsible
for developing the final list of high-risk tasks and for using this
data to updating the OICTP. However, inputs are required from LOGCEN,
ADMINCEN, and DARCOM. The TSM/POC should help coordinate the prepara-
tion of these inputs.

Phasing. This event should begin about three months prior to the
scheduled beginning of Event B20 (Preparation of the ROC/LR) and
should be completed within that time. Events B18, B19, B21 and B22
should be conducted concurrently and by the same persons.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENTS B19 AND B18

The OICTP updating that followed preparation of the TRADOC IER
(Events B12 and B13) concentrated primarily on high-risk tasks.
Attempts should have been made to incorporate into that OICTP the
impact of proposed changes in materiel, equipment operation, and tac-
tics. However, some of these changes probably were not obvious when
Event B12 began. The current OICTP update (B18) takes place some
months later and is the final version of the ICTP produced prior to
preparation of the ROC (B20). Therefore, the ICTP resulting from
Events B17 through B19 must be as current as possible. It must

include the impact on training of (a) changes in materiel design,
b) changes in operation and support concepts and procedures, (c)
changes in tactical concepts; and (d) any personnel studies conducted
as the result of OT I findings.

Training-related activities during Events B17 through B20 should
begin the transition from emphasis on high-risk tasks to the develop-
ment of a total training subsystem. This requires the development of
an inventory of low-risk tasks and the identification of training
materials and job performance aids required in support of these tasks.

The general procedures for preparing a task inventory, for iden-
tifying high-risk tasks, and for updating an OICTP have already been
reviewed in this handbook (Events A6, A7.1, B2, and B12). During
Event B19 the emphasis should be on developing two sets of task inven-
tories. One list will consist of tasks that, because of recent
changes in materiel, operator requirements, etc., no longer need to be
considered for training. A second, and probably much longer, list
will consist of additional tasks that need to be considered for
training and therefore need to be incorporated into the OICTP. To
develop these two sets of tasks the following steps are suggested:

a. Through the materiel developer, obtain the most recent changes
   in equipment design. The impact of these changes should be
   reflected in the latest LSA data prepared by the contractor.
   These data are continually updated by the contractor and
   is available to the training proponent. The LSA information
   should also reflect changes in operator and maintenance per-
   sonnel requirements.

b. From the combat developer, obtain the latest information on
   the tactical concept for the equipment, the organizational
   structure of the employing unit, and so on.

c. From the logistic proponent, obtain the latest information
   about changes in the logistics support concept.

d. On the basis of the foregoing information, identify those
   operator and maintenance tasks that are no longer required;
   also, identify new operator and maintenance tasks.
   Comparisons between LSA data provided by the contractor
   prior to OT I (B2) and the most recent LSA data provide
   the basis for these actions.

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e. For the new tasks, determine whether a new job position, MOS, or skill level appears to be required, or whether the task will be performed by persons holding already identified MOS and skill levels.

f. For each new individually-performed task, decide whether it is a high-risk or a low-risk task. If it is high-risk, identify the means by which the task will be trained. If it is low-risk, determine whether job aids or self-instructional material are needed.

g. Identify those new tasks that are related to unit or crew training. Identify high- and low-risk tasks. Develop a training plan for each high-risk task. Identify the support required, if any, for low-risk tasks.

h. Compile a complete inventory of low-risk tasks. This inventory should have been developed originally by the contractor as part of the TASA data provided during Event B2. Using recent LSA data, update this inventory and identify those tasks that need to be covered by some sort of training or by performance aids.

i. As a final step in this process, revise the task inventories already developed for each MOS and skill level to incorporate additions and deletions developed during Event B19.

Two of the inputs to Event B19 consist of (a) an updated list of individual tasks supplied by the contractor, and (b) an updated list of collective tasks provided by the combat developer. Accompanying each task in these lists should be a variety of data typical of that generated by the FEA/TASA for individual and for collective tasks. These data should include a description of Human Performance Standards (for individual tasks) and Crew Performance Standards (for collective tasks).

During the development of a training plan for a task, a decision must be made regarding the degree to which the training criteria for that task will match the field performance standards for the task. This process, determining the degree of similarity between performance standards and training criteria, is accomplished during Events 21 and 22 of TRADOC Regulation 600-4. These events should be performed concurrent with Event B19.

INPUT DATA/EVENT BASE

a. Information on changes in materiel design

    Description: Changes in materiel design should be reflected
    in equipment drawings and in recent LSA data for operator
    and maintenance personnel.

    Data Source: LSA Reports from contractor.

    When Available: On a continuing basis.

    Access Procedure: Request from materiel developer if not
    already on LSA data distribution list.

b. Information on changes in tactics

    Description: That portion of the IER prepared by the combat
    developer should discuss proposed changes in tactics.
    Follow-on reports and memoranda should have been prepared
    describing the changes that have been accepted.

    Data Sources: The IER and the combat developer representa-
    tive at proponent school.

    When Available: Changes in tactical concepts should be
    finalized some months prior to preparation of the ROC.

    Access Procedure: Request from combat developer.

c. Information on changes in logistic concept

    Description: Document describing latest maintenance support
    concept. IER prepared by Operational Tester may contain
    proposed changes.

    Data Source: LOGCEN school.

    When Available: A few months prior to preparation of ROC.

    Access Procedure: Request from LOGCEN representative.

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d.   An updated list of tasks

   Description: A list of tasks performed by individuals,
   categorized by MOS and skill level. Also, a list of
   tasks performed by crews or teams.

   Data Source: Individually-performed tasks can be obtained
   from the contractor. Collectively-performed tasks can
   be obtained from the combat developer.

   When Available: Two to three months following OT I--
   following completion of Event B9, Verify/Revise Task List.

   Access Procedure: Request from contractor or combat
   developer as appropriate.

OUTPUTS AND END PRODUCTS

a.   Description: For each MOS and skill level: (a) a list of
   high-risk tasks subdivided into individually and
   collectively performed tasks; and (b) a list of low-risk
   tasks also subdivided into individual and crew tasks.
   For each task, information should be presented regarding
   how training is to be accomplished and the requirements
   for support of the task. For each task, minimum per-
   formance requirements should be established.

b.   Output Usage: Information will be used to update training
   support plan for OICTP (B18), for preparing Human Per-
   formance Standards (B21), and for establishing training
   criteria (B22).

c.   Availability Requirements: Events B18, B19, B21, and B22
   should be conducted concurrently and by the same persons.
   These events must be completed in time to incorporate their
   outputs into an ICTP (Event B17).

REFERENCES

   AR 700-127, Integrated Logistic Support
   DARCOM Supplement #1 to AR 700-127, Integrated Logistic
                                       Support
   TRADOC Regulation 350-2, Development, Implementation, and
                            Evaluation of Individual Training
   See also References for Event B17

19. EVENT B20--REQUIRED OPERATIONAL CAPABILITY (ROC)

OVERVIEW

Purpose. The Required Operational Capability (ROC) is a document that presents the minimum operational, technical, logistical, and cost information essential for making decisions related to the development and procurement of a system. In includes an assessment of personnel factors that will have an impact on further full-scale development of the system. These factors include:

a. Personnel interface with existing and projected equipment.

b. Training and training device requirements.

c. Desired system safety and human engineering characteristics.

This document contains the information necessary for the Acquisition Plan (AP) and the basis for the Decision Coordinating Paper (DCP) used in the ASARC/DSARC review process. All supporting studies included as appendices or used as input to the ROC must be revised and updated with the latest information available, in particular that gained from OT I. For low value items a Letter Requirement (LR) may be used in lieu of a ROC.

Relationship to LCSMM/IPS Events. The requirements document, ROC or LR, presents in a concise format the updated information prepared during all the events from B15 to B22 of the IPS (Events 24 through 30 of the LCSMM).

TSM/POC Responsibilities. The TRADOC user proponent is responsible for preparation of the requirements document. As TRADOC representative, the TSM should coordinate these activities and also, at a minimum, should:

a. Ensure that performance standards and testing objectives are updated.

b. Ensure that OICTP is updated and is in sufficient detail to allow reasonable life cycle costing.

c. Ensure that the above data are provided to organizations responsible for preparing cost estimates.

d. Ensure that COEA and supporting CTEA reflect the latest estimates available after completion of OT I.

Phasing. Plans for preparing a ROC should be formulated as soon as it appears that development of a cost-effective system is feasible. The ROC should be available for distribution to interested agencies about six months prior to the scheduled date for ASARC/DSARC II.

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GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B20

The Required Operational Capability (ROC) document must provide all the information necessary to allow a decision to be made on further development of the system. The ROC is a concise summary of the system. The ROC is a concise summary of the system characteristics, based on a series of evaluations using the results of OT/DT to update previous estimates. The summary document itself is only a few pages, usually about four, but is supported by updates of all studies used to prepare the Concept Formulation Package, Event A9 (pages III-48).

The TSM's basic responsibility is to review these supporting documents to ensure consistency and the inclusion of the latest basic data obtained during OT I. The documents of prime concern are the PQQPRI, BOIPT, ICTP/NETP, and the COEA/CTEA. These documents, initially prepared during the Conceptual Phase, must be revised and refined to the extent that no major technological issues related to personnel or training remain to be resolved and that the minor remaining issues are identified for further evaluation during OT II.

The procedures for updating the PQQPRI, BOIPT, and ICTP are discussed under Events B15, B16, and B17, respectively. As discussed earlier with respect to the LCSMM in general, the sequencing of these events is not always the same. These documents are frequently being developed in parallel and certain trade-offs are agreed upon during the updating process. As a general rule, the updated CTEA requires the input from the updated PQQPRI, as does the BOIPT. The ICTP requires the input of the PQQPRI as evaluated in the CTEA, as does the COEA.

Both the COEA and supporting CTEA should use the same methodology previously employed in support of Event A10 to determine whether significant differences exist because of the introduction of new data obtained from OT I. If difficulties in implementing the proposed training plan are identified, a second CTEA may be required to assess alternative media approaches to training the MOS/SSI selections of the PQQPRI. If this is the case, the results of both analyses should be incorporated in the supported COEA.

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INPUT DATA/EVENT DATA BASE

a. ICTP: See Event B15 (page IV-46).

b. BOIPT: See Event B16 (page IV-49).

c. COEA

   Description: An update of the COEA performed for the
   Concept Formulation Package, Event A9, using the data ob-
   tained during the performance of IT I.

   Data Source: OT I test report, IER.

   When Available: As developed.

   Access Procedure: Obtain from Combat Developments of
   proponent school.

d. CTEA

   Description: An update of the CTEA performed in support
   of the CFP, using information gathered during OT I.

   Data Source: Training Developments, proponent school.

   When Available: Prior to COEA.

   Access Procedure: Attain from Training Developments
   of proponent school.

OUTPUTS AND END PRODUCTS

   Together with information gathered from independent evaluations
and reviews of the OT data, the ROC forms the basis for revision of
the Acquisition Plan, which is the basis for the development contract.

   As a decision document, the ROC provides the basic information
necessary to develop the Decision Coordinating Paper (DCP) required
by the ASARC/DSARC process.

REFERENCES

        AR 71-9, Materiel Objectives and Requirements
        TRADOC Circular 351-8, Individual and Collective Training
                            Plan for Developing Systems
        ARI-TR-78-A7, TSM Guide to Training Development and
                            Acquisition for Major Systems

EXAMPLES AND ILLUSTRATIONS

a. The instructions for the format for Required Operational Capability (ROC), as set forth in Appendix E, AR 71-9, are reproduced in Example IV-4.

b. See Annex A for sample.

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APPENDIX E, AR 71-9

FORMAT FOR REQUIRED OPERATIONAL CAPABILITY (ROC)

A ROC submitted to DCSOPS for approval will be in the format provided
below. The quantity of information in the ROC should be limited to
that necessary for a HQDA decision. For most systems, four pages is a
reasonable goal. Information will be submitted to the extent that it
is available to the originator of the ROC.

1. Statement of the need.

    a. A descriptive title and brief statement of the requirement.

    b. CARDS reference number (to be assigned by ODCSOPS during ROC
       approval process).

2. Time frame. A statement of the time frame in which the new or
improved system is required. The IOC date will be included when
known.

3. Threat/operational deficiency. A brief paragraph which states
concisely the capability goal, threat or operational deficiency which
the system will achieve or overcome.

4. Operational/organizational concept. A brief paragraph which sta-
tes how the equipment will be used, geographical areas of use, and the
type of unit and the estimated number of personnel that will use and
support the equipment.

Example IV-4, Format for Required Operational Capability (ROC)

5.   Essential characteristics. State only those principal performance characteristics, and reliability, availability, and maintainability (RAM) characteristics which are necessary to describe the operational features of the system. Essential performance and reliability characteristics will be expressed in bands of performance. Those characteristics which are not suitable for banding will be stated as single value characteristics. During development of these characteristics, consideration should be given to inclusion of commerical., other service, NATO or other Allied nation characteristics of existing or programmed systems, with a view toward establishing the basis for interoperability, co-production or standardization. Bands of performance should be sufficiently flexible to accommodate consideration or competing systems of other service or Allied nations. Adjustment of the stated bands of performance, or single value characteristics will be made only after the combat developer and the materiel developer agree that such changes are necessary and approved by DCSOPS.

6.   Technical assessment. A brief paragraph which provides an analysis of the technical effort required. Major areas for full-scale development effort will be addressed in terms of scope, technical approach, and associated risks.

7.   Logistic assessment. This paragraph will identify logistic considerations which have an impact on further full-scale development of the materiel and logistic support systems. Such considerations will have evolved from the advanced development effort and include:

   a.   A baseline logistic support concept.

   b.   Potential logistic problem areas.

   c.   Preferred limits on the need for logistic support element resources.

   d.   Current and projected changes to pertinent supply, maintenance, and transportation systems and procedures (e.g., resupply of ammo consideration).

8.   Other service or Allied nation interest. A discussion of other service, NATO, or other Allied nation interest in the Army development/ procurement. Provide data on other service or Allied developments with view toward establishing potential for standardization/inter-operability or co-production.

Example IV-4 (Continued)

9. Training assessment. Discuss the need for training devices, New Equipment Training Teams (NET) operator and maintenance personnel training and Integrated Technical Documentation and Training (ITDT) requirements.

10. Life cycle cost assessment. An estimate of total life cycle costs will be provided using primarily summary level parametric estimating techniques. This assessment will be expressed in terms of the major cost categories of research and development, investment nonrecurring, investment recurring, and operating. Also included will be the design to cost goals. To the extent feasible, this assessment will reflect the estimated cost of major items or components below the system level.

Example IV-4 (Continued)

20. EVENTS B21 and B22--HUMAN PERFORMANCE STANDARDS AND TRAINING CRITERIA

OVERVIEW

Purpose. The purpose of this event is to date field performance standards for the inventory of tasks selected for training and to establish training criteria for each task.

Relation to LCSMM/IPS Events. These two events are part of the whole process of updating the OICTP and must occur each time new tasks are selected for training and/or when training plans for a particular task are revised.

TSM/POC Responsibilities. Establishing human performance standards is the responsibility of those who identify individual or collective task requirements. The training developer is responsible for establishing training criteria but should coordinate this activity with the contractor or combat developer as appropriate.

Phasing. These events should be accomplished as part of the process of updating the OICTP.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENTS B21 AND B22

Each time a new task requirement for humans is identified, the performance standards for that task must also be determined. These standards are first determined by the contractor (B2), as part of the FEA/TASA data provided to the training and materiel developers. During Event B3 the training developer should verify the standards for individual tasks and the combat developer verifies the standards for collective tasks.

As the result of OT I and subsequent changes in materiel design, operator/crew requirements, and tactics human performance requirements for some tasks may change. These changes in requirements should be reflected in subsequent LSA data prepared by the contractor or in new mission descriptions prepared by the combat developer.

Human Performance Standards or criteria describe field performance requirements for tasks. These standards also serve as the criteria for judging acceptability of performance. As described in TRADOC Circular 351-4, performance standards can include any combination of the following:

    a.   Process standards--when the task must be performed in a certain sequence of steps or task elements.

b. Product standards--when the output/product must meet certain specifications.

c. Time standards--when the task must be completed within a certain period of time.

During the early part of Event B19, as noted earlier, the training developer must assure that, for each individual or collective task selected for training, individual/crew performance standards have been established. If this has not been accomplished, the information should be requested from the contractor or the combat developer as appropriate.

Training programs or SPA/ETM material seldom fully prepare individuals to meet field performance requirements. The training criteria established for training programs usually are set at a lower skill level than that required for acceptable field performance. It is usually assumed that training will prepare a person so that, with additional practice on the job, he can meet performance requirements. Similarly it is usually specified that SPA/ETM material be designed so that users of the material can perform accurately but not quickly. With continued practice in the use of SPA/ETM material, the performer becomes more skillful (e.g., performs faster).

The procedures for establishing training criteria or standards for training programs and/or SPA material are not well defined. In general they involve:

a. Determining the importance of performing correctly the first time the task is performed on the job.

b. Determining the time between end of formal training and the requirement to perform task in the field.

c. Determining opportunities for training/practice in the field prior to performing the task.

d. Determining the extent to which the initial task performance will be supervised.

Generally speaking, the training criteria for a task will be set below that required for acceptable field performance when there are opportunities for practicing the task in the field under supervision, and when accuracy but not speed is important the first few times the task is performed. If both speed and accuracy are required when the task is first performed, then the training criteria should be similar to performance standards. This applies especially for high-risk tasks or dangerous tasks that may be performed a considerable length of time

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after formal training. Often an effort is made to overtrain on such tasks to compensate for some decrement in performance due to lack of practice.

Training criteria often vary depending on the stage of learning. During the early period training standards may be low, then gradually raised as training progresses. Toward the end of training the standards may exceed those required on the job.

INPUT DATA/EVENT BASE

See Event B19 (page IV-61).

OUTPUTS AND END PRODUCTS

a. Description: This event will not produce a separate output. Rather, it will generate one of the outputs of Event B19, namely, training criteria for each task selected for training.

b. Output Usage: As inputs to Event B18, a continuation of the OICTP update.

REFERENCES

TRADOC Pamphlet 350-30, Interservice Procedures for Instructional System Development
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition for Major Systems

21. EVENT B23--REVIEW IER OT/DT I

OVERVIEW

Purpose. The purpose for reviewing the Independent Evaluation Report (IER) is to ensure command (TRADOC) agreement with the results and conclusions. "Any interested agency or command, including those senior to the tester, may forward to decision reviews the results of their reviews and recommendations" (AR 70-10).

Relationship to LCSMM/IPS Events. The review of the IERs by TRADOC, Event B23, is not specifically identified in the LCSMM but is implicit in Events 35 and 36.

TSM/POC Responsibilities. The IERs are the responsibility of the materiel developer and operational tester with assistance from user representative, combat developer, and logistician. This assistance is

in the form of a review and evaluation of that part of the Test Report pertinent to each individual agency. The TSM should coordinate this information exchange, note any unresolved differences in conclusions among agencies, and forward the differences with recommendations on the command position to HQ TRADOC for submission to ASARC II if necessary.

Phasing. The IER must be submitted to ASARC two weeks prior to initial review. The TRADOC review of the IER therefore should be completed at least one month prior to submission to allow time to resolve differences and to develop a command position if necessary.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B23

The references cited and the illustrations provided are pertinent to the Independent Evaluation Report itself rather than to a review of this document. There are no known formal procedures for reviewing an IER. The basic purpose of the review procedures is to ensure concurrence with the results and conclusions. If concurrence cannot be reached at the draft stage of the IER, then a command position on results and recommendations must be reached and submitted to ASARC.

In general, the sequence from the development of the Independent Evaluation Plan (IEP) to submission of the IER should occur in the following manner. The materiel developer and the operational tester each prepares a master plan for all his evaluation responsibilities. Each asks all the involved commands and agencies for their test issues and test objectives. These are incorporated in the Test Design Plan and the Detailed Test Plan, and the tests, OT/DT I, are conducted. Test reports are then prepared by the respective agencies, incorporating the test results, test conditions, and an analysis of test results versus test objectives.

When the report is approved, it is disseminated to the agencies submitting the test issues and to the involved commands and agencies for further evaluation. Their comments and evaluations will be considered, together with the test report, in developing the IER. Should an agency or command other than the tester disagree with one or more conclusions of the IER, it must develop a command position for forwarding to the ASARC.

It is the responsibility of the TSM to ensure the information flow required by this process is maintained and responsive and to assist where non-concurrence is found. If resolutions among non-concurring TRADOC agencies cannot be achieved during the draft stage of the IER, then the TSM should assist in preparing a TRADOC command position for ASARC II.

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INPUT DATA/EVENT DATA BASE

a. Test Reports

Description: Test results and analysis of test issues versus test objectives of OT I and DT I.

Data Source: OT--OTEA, DT--DARCOM.

When Available: As developed.

Access Procedure: Provided by the source.

b. Independent Evaluation Reports

Description: Consolidation of all studies and evaluations associated with the test results and test reports.

Data Source: OT--OTEA, DT--DARCOM.

When Available: As developed.

Access Procedure: Provided by the source.

OUTPUTS AND END PRODUCTS

a. Concurrence or non-concurrence with IERs. Non-concurrence requires separate submission to ASARC.

b. Test issues for further evaluation during OT II.

REFERENCES

AR 10-4, U.S. Army Operational Test and Evaluation Agency
AR 70-10, Test and Evaluation during Development and
              Acquisition of Materiel
AR 71-3, User Testing
OTEA, Operational Test and Evaluation Handbook

EXAMPLES AND ILLUSTRATIONS

For sample, see Example IV-5, page IV-78.

INDEPENDENT EVALUATION REPORT

CONTENTS

Executive Summary

1. Purpose and Scope
2. Test item
3. Adequacy of Testing
4. Operational test limitations
5. Operational issues
6. Major findings
7. Other findings
8. Conclusions

Section 1.0 General
Authority
Purpose and scope
Data sources
Background
Adequacy of operational testing
Threat

2.0 Operational Test Analysis
Operational issue analysis
Item tested
Operational test (OT I, II, or III) description
Evaluation of operational issues

3.0 Performance Issues
4.0 Logistic Support Issues
5.0 Reliability, Availability, and Maintainability
6.0 Survivability Issues
7.0 Training Issues
8.0 Organization Issues
9.0 Conclusions

Appendix A Future Testing Requirements
Abbreviations and Acronyms
Operational Issue Index

Example IV-5 . Sample Format of Independent Evaluation Report

22. EVENT B24--ACQUISITION PLAN (AP)

OVERVIEW

Purpose. The Acquisition Plan (AP), Event B24, is an update and refinement of the Outline Acquisition Plan, Event A10, based on the information gained from OT/DT I and supporting studies. Its purpose is to provide the ASARC/DSARC review process with the long-term implications of the procurement of the system and with the specifics for the Full-Scale Development contract. With this information the reviewers will be able to make a judgment of whether to continue the program.

Relationship to LCSMM/IPS Events. The Acquisition Plan, Event B24 in the IPS, is called a Development Plan (DP), Event 33, in the LCSMM. The difference in terminology does not affect the desired content.

TSM/POC Responsibilities. The preparation of the Acquisition Plan is the responsibility of the materiel developer, usually DARCOM, in coordination with the TRADOC proponent and the TSM. The TSM should review all supporting material, dealing with personnel and training most of which was developed during preparation of the ROC, and ensure that the input data are consistent and the latest available.

Phasing. The Acquisition Plan is prepared immediately after the STF/SSG review of the ROC.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B24

The Acquisition Plan is essentially an update of the Outline Acquisition Plan that was prepared during the Concept Phase (A10, page III-56. The OAP is now modified on the basis of data gathered on the test issues identified at MILESTONE I and investigated during OT/DT I. The data on the personnel and training issues are presented in Section V of the AP, Plan for Personnel and Training Requirements, and include identification of new skills, individual and crew training requirements, SPA requirements, training devices, training facilities, and associated schedules related to all aspects of the development.

The procedures for updating the OAP to form the Acquisition Plan have been covered under the previous discussions of supporting documents. The format of the AP is the same as the OAP, Event A10. Since the AP is the information source for the ASARC/DSARC, more guidance about content can be gained from Appendix B, AR 15-14, checklist for MILESTONE II Reviews (included in Event B26 as Example IV-6, page IV-85).

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INPUT DATA/EVENT DATA BASE

a.   ROC, Event B20 (page IV-66).

b.   IER, Event B23 (page IV-75).

OUTPUTS AND END PRODUCTS

The Acquisition Plan provides the basis of information for deve-
lopment of the Army Program Memorandum (APM) and the Decision
Coordinating Paper (DCP). These documents are the principal decision-
recording documents on the system for which the Secretary of the Army
and the Secretary of Defense, respectively, are the final approval
authorities.

REFERENCES

AR 15-14, Systems Acquisition Review Council Procedures
AR 70-1, Army Research, Development and Acquisition
AR 70-27, Outline Development Plan, Development Plan, APM,
          DPM, and DCP
AR 700-127, Integrated Logistic Support
TM 38-703 Series, Integrated Logistic Support
TM 38-710, Integrated Logistic Support Implementation Guide
          for DOD Systems and Equipment

23.   EVENT B25--INPUT FOR INITIAL RECRUITING AND TRAINING PLAN (IRTP)

OVERVIEW

Purpose. The Initial Recruiting and Training Plan (IRTP) is a
reverse planning document which predicts the critical dates for person-
nel and training actions prior to the deployment of the new system.
The plan assists all agencies involved in monitoring the flow of per-
sonnel and training products and provides a means for planning the
interaction with other systems having similar requirements.

Relationship to LCSMM/IPS Events. This event relates more to
annual planning than to the system development cycle. The IRTP is an
output of the IPS based on the QQPRI and ICTP and is used both as a
planning document and as input to the annual updating of the New
Equipment Personnel Requirements Summary (NEPRS).

TSM/POC Responsibilities. The IRTP is normally prepared by
MILPERCEN on the basis of information provided by the proponent TSM and
ADMINCEN, and the integration of these inputs with the requirements of
other systems and organizations.

Phasing. The TSM should ensure that any updated information on personnel and training requirements is available to MILPERCEN as it develops.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B25

The responsibility for preparing of the IRTP rests with MILPER-CEN. As per AR 611-1, MILPERCEN is responsible for, among other things:

   a. Acquiring data and preparing specifications for occupational
      and personnel requirements during development of new
      systems.

   b. Keeping the New Equipment Personnel Requirements Summary
      (NEPRS) current.

Some of the pertinent input required for these activities comes from the system proponent through the TSM. The TSM should consult with ADMINCEN concerning the preparation of the IRTP.

Appendix E of TRADOC Regulation 600-4 provides the procedures for the preparation of the IRTP input concurrent with the preparation of the AP. Further information can be gained from a study of NEPRS.

INPUT DATA/EVENT DATA BASE

   a. QQPRI, Event B15 (page IV-46).

   b. ICTP, Event B17 (page IV-55).

   c. NEPRS, Event B16 (page IV-49).

   d. TSP, Event B13 (page IV-43).

OUTPUTS AND END PRODUCTS

   a. IRTP
   b. Updated NEPRS

REFERENCES

AR 611-1 Military Occupational Classification Structure,
          Development and Implementation

Army Circular 601-70 Total Army Recruiting Support Plan
TRADOC Regulation 600-4, Appendix E, Initial Recruiting and
Training Plan

24. EVENT B26--ASARC II/DSARC II/IPR

OVERVIEW

Purpose. The general purpose of the ASARC/DSARC/IPR review pro-
cedure is described under Event A12 (page III-60).   The specific
purpose of the Milestone II review is to determine whether the
demonstration and validation activity has been completed and a need
for the system still exists. If the results of the reviews are posi-
tive, the Secretary of Defense will reaffirm the mission need and
approve selection of a system for full-scale engineering development,
including procurement of long-lead production items and limited pro-
duction for operational test and evaluation, as set forth in DODD 5000.1.

Relation to LCSMM/IPS Events. The review procedure is based on
the information provided in the Acquisition Plan, Event B24, which
incorporates the ROC or LR as required and the Independent Evaluation
Report of OT/DT I. It is Event 42 of the LCSMM.

TSM/POC Reponsibilities. The TRADOC representative will be a
member of an ad hoc working group formed approximately 11 months prior
to the scheduled ASARC. This group will determine the training and
personnel issues to be included. The TSM must insure that the issues
determined by the system proponent in the areas of logistics, person-
nel and training, are disseminated to the appropriate agencies for
resolution. He will be called upon to brief the first five items of
the agenda listed in Event A12 at ASARC II.

Phasing. Approximately 4 to 6 months prior to a scheduled SECDEF
decision for a major system, the DSARC will initiate action to request
a milestone meeting. Approximately 11 months prior to the ASARC the
ad hoc working group will prepare the ASARC agenda. See Event A12.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT B26

Guidance for preparation for the review procedures for Milestone
II is provided in DODD 5000.1, DODD 5000.2 and AR 15-14, Appendix B
(included herein). The basic elements the system proponent must
address are:

    a.   Impact on MOS structure and individual training.
    b.   Use of simulators for individual and unit training.
    c.   Steps to minimize maintenance and support personnel.

d. Plan for ILS.
e. Validity of cost estimates, including COEA costs.

These issues should have been thoroughly covered in the BOIPT, PQQPRI, and ICTP. The issues remaining unresolved should be stated in the AP with recommendations on the method and timing of their resolution.

At the ASARC/DSARC/IPR reviews, a decision will be made as to whether any of these issues are critical enough to delay continuation of development. If not then it will be recommended to the Secretary of Defense or other approving authority that the system enter the Full-Scale Engineering Development Phase. This recommendation is made in the form of a Decision Coordinating Paper (DCP) of no more than 20 pages.

INPUT DATA/EVENT DATA BASE

Output of Event B24.

OUTPUTS AND END PRODUCTS

a. ASARC/DSARC/IPR Decision

Description: A SECDEF/DA/Proponent decision to continue to the Full-Scale Engineering Development Phase.

Output Usage: Contract award for system development.

Availability Requirement: Immediate upon decision.

b. Critical Issues

Description: Identification of remaining personnel and training issues to be resolved and recommendations for the method and timing of their resolution.

Output Usage: Issues for personnel studies, in accordance with AR 70-8, and for inclusions in OT II and subsequent COEA and CTEA.

REFERENCES

DODD 5000.1, Major Systems Acquisition
DODD 5000.2, Major System Acquisition Process
DODD 5000.26, Defense Systems Acquisition Review Council
                 (DSARC)
AR 15-14, Systems Acquisition Review Council Procedures

EXAMPLES AND ILLUSTRATIONS

The checklist for Milestone II (Appendix B, AR 15-14, is reproduced in Example IV-6, page IV-85).

CHECKLIST FOR MILESTONE II REVIEWS
(END DEMONSTRATION AND VALIDATION PHASE,
BEGIN FULL-SCALE ENGINEERING DEVELOPMENT PHASE)

The following items will be reviewed at Milestone II:

a. *Need.* The mission element task is reaffirmed to be essential.

b. *Threat.* The updated threat is credible, addresses the correct timeframe, and has been validated by CG, INSCOM, in coordination with ACSI and, when appropriate, by DIA.

c. *Recommended System/Program Alternative.*

(1) Satisfies the mission element need(s).

(2) Is cost-effective.

(3) Is within established constraints.

(4) Is supported by results of demonstration and validation.

(5) Considered foreign and other service alternatives.

(6) Provides for service and NATC standardization and interoperability.

(7) Takes into account joint service implications.

(8) Takes into account environmental considerations (DODD 6050.1).

(9) Systems tradeoff has produced the most effective balance between costs, performance, and schedule, including operational and logistical consideration.

(10) Establishes nuclear survivability criteria.

d. *Operational Factors.*

(1) Ensures electromagnetic compatibility and frequency supportability.

(2) Identifies electronic/infrared/optical counter-countermeasure performance requirements (DODD 4600.3).

(3) Provides adequate force structure plan and schedule for phasein; AAO and distribution plan.

(4) Addresses impact on Reserve Components.

(5) Addresses impact on MOS structure and individual training.

(6) Includes use of simulators for individual and unit training.

(7) Establishes performance goals and thresholds.

(8) Recommends disposition of current family or series of equipment being replaced or phasedout.

e. *Logistical Factors.*

(1) Minimize O&S costs.

(2) Minimize maintenance and support personnel.

(3) Establish RAM goals and thresholds.

(4) Plan ILS.

f. *Cost.*

(1) Establishes validity of cost estimates, including COEA costs.

(2) Establishes realistic design-to-cost (DTC) goals and thresholds for—

(a) Hardware design-to-cost.

(b) O&S costs.

(3) Program cost thresholds and fiscal year thresholds.

g. *Acquisition Strategy.* Has been updated, effectively supports achievement of program objectives, and is being executed in the conduct of program management.

(1) Short- and long-term business planning supports the strategy.

(2) Contract types are consistent with the program characteristics, risks, uncertainty, and strategy.

(3) Producibility and production risk considered.

(4) Planning for selection of major subsystems is clearly stated, maximizes sustained competition, and accepts the use of existing military and commercial equipment as appropriate.

(5) Requirements established for—

Example IV-6. Checklist for Milestone II Reviews

(a) Long-lead procurement items.

(b) Initial limited production to support OT&E needs.

(c) Verification of production engineering and design maturity.

(d) Establishing the production base.

h. Schedule. Goals and thresholds established.

i. Risk.

(1) Uncertainties and risks identified and acceptable.

(2) Adequate plans to resolve remaining uncertainties and risks.

j. Testing.

(1) Results of DT/OT I support recommendations.

(2) Adequacy of testing, critical issues remaining to be resolved by testing, quality of test efforts, validity of test results, and plan for further testing.

(3) Update of Coordinated Test Program (CTP).

k. Program Management.

(1) Structure.

(2) SAR initiated (DODI 7000.3).

1. TJAG Legal Review. Consistent with international law.

Example IV-6. (Continued)

SECTION V

IPS MODEL:
FULL-SCALE ENGINEERING DEVELOPMENT PHASE (FSED)

A. OVERVIEW

     During the Full-Scale Engineering Development (FSED) Phase of the
LCSMM, an advanced prototype of the materiel is developed and tested,
deficiencies identified, and corrective solutions developed. The
overall goal of the phase is to demonstrate (1) the technical feasibi-
lity of developing the materiel, and (2) the military usefulness of the
materiel.

     At the end of the FSED Phase the evidence should be clear as to
whether (1) full-scale production of the materiel and its support
system is warranted or (2) further development and testing is needed.

B. SCOPE

     During this phase the complete logistic support package for the
materiel is developed and tested. This package includes programs for
new equipment training and for individual and collective training.
Training devices, training ammunition and ranges, training administra-
^ive procedures, and so on also are developed, validated, and revised.

     Human factors considerations such as selection criteria, MOS and
skill level requirements, and aptitude/experiential/physical/attitudi-
nal requirements are assessed in OT II and related activities, and
revised to reflect the findings.

     Major training activities during this phase include:

     o   Awarding training development/production contract.
     o   Developing training materials and devices.
     o   Developing and starting new equipment training.
     o   Validating training programs and material, to include
          SPA material.
     o   Developing/incorporating training inputs into requirements
          documents.

     The flow chart for the major events in this phase is shown in
Figure II-5, and in the Chart for Phase III in the back of this hand-
book (based on Figure 3, TRADOC Regulation 600-4). In this chart, two
major events--C1 and C2--are shown as occurring prior to DT/OT II.

Event C1 (Input DT/OT II) encompasses so many important activities that it will be subdivided into its major elements for separate discussion in this handbook. These elements include: (a) development and award of a production contract for both materiel and training; (b) preparation of revised/updated TASA data; (c) revision/updating of the ICTP; (d) development of training programs and devices; and (e) preparation of DT/OT II evaluation plans. They are comparable to IPS Events B1 through B5 of the Validation Phase of the LCSMM.

Also, prior to DT/OT II, in Event C2, SPA material must be prepared and new equipment training programs developed. These activities are the responsibility of the materiel developer and usually are accomplished by the contractor. These activities also will be discussed separately, under Events C2a and C2b. Acquisition of training devices will be discussed separately, in Event C2c. The relationship between C1 and C2 activities is shown in Figure V-1.

It should be noted that there is a numbering discrepancy between the text and the diagrams of TRADOC Regulation 600-4, caused by separating the discussions of DI II and OT II. In this handbook the numbering system used in the text refers to the text of TRADOC Regulation 600-4 (the flow chart diagram follows the numbering used in the TRADOC diagram).

C. DISCUSSION OF EVENTS
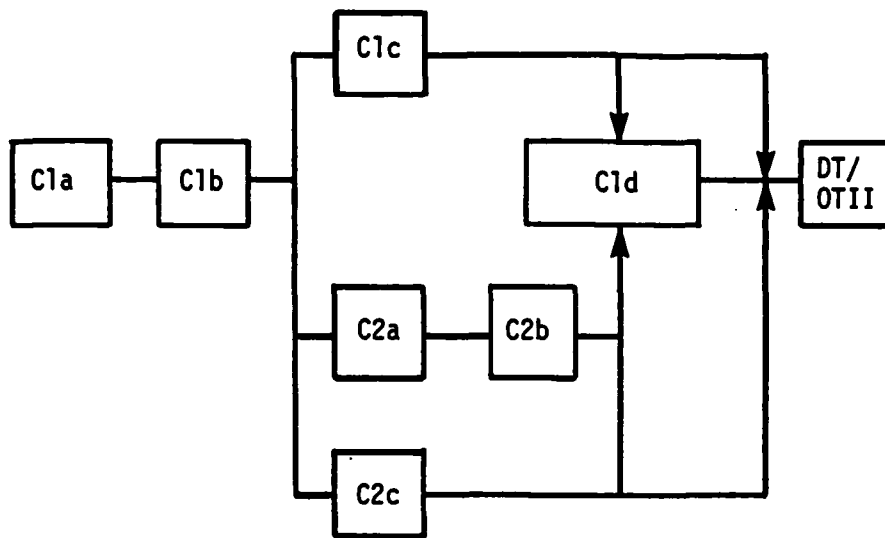
1. EVENT C1a--PREPARATION AND AWARD OF FSED CONTRACT

OVERVIEW

Purpose. The purpose of this event is to ensure that the contract provides for responsive answers to the personnel and training issues identified in the Acquisition Plan (AP).

Relationship to LCSMM/IPS. This event is incorporated in planning for OT II. Contract award is Event 45 in the LCSMM but preparation of the issues to be included was accomplished for inclusion in Event 41.

TSM/POC Responsibilities. The awarding of the contract is the responsibility of the materiel developer. The TSM should insure that the latest available information on the issues determined during Event B24 (Acquisition Plan) is included and that access to data needed during contract performance is provided.

Phasing. As soon as possible after ASARC II/DSARC II/IPR decision(s).

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Cla - Preparation/Award of FSED Contract

Clb - TASA/ICTP Update

Clc - Development of Training Material/Programs

Cld - Preparation of DT/OT II Test and Evaluation Procedures

C2a - Development of SPA Material

C2b - Development of New Equipment Training

C2c - Acquisition of Training Devices

Figure V-1, Events C1 and C2 of IPS

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C1a

Although the input information is more detailed, because of
experience in OT I and evaluations of its results, the contract for
FSED is much like that for DVAL. The objectives are more fully
defined but the procedures are similar to those in Event B1 (page
IV-2). The points to emphasize are those discussed for the AP,
Event B24, to ensure the incorporation of the latest available infor-
mation.

INPUT DATA/EVENT DATA BASE

a. Acquisition Plan, Event B24 (page IV-79).
b. Updated Studies--Personnel Studies, CTEA/COEA, Evaluation
   Reports.

OUTPUT AND END PRODUCTS

Responsive contract and selected contractor.

REFERENCES

Same as Event B1.

2. EVENT C1b--TASA/ICTP UPDATE

OVERVIEW

Purpose. During this event the TASA data developed during DVAL
are updated, final selection is made of those tasks to be covered by
the training programs, and an updated version of the individual and
collective training plan is prepared.

Relation to LCSMM/IPS Events. The outputs of Event C1b provide
the data base for all training-related activities prior to the DT/OT
II (Events C3 and C4).

TSM/POC Responsibility. The TASA data are provided by the con-
tractor. The TSM should assure that these data are forwarded to the
training proponent and the combat developer. The training developer
should update the ICTP. The TSM/POC functions as a coordinator of
these activities.

Phasing. The event should be completed within 24 months of the
scheduled date for DT II.

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GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C1b

During the early stages of the FSED contract the contractor will begin the development of SPA material (preparation of this material discussed under Event C2a). The initial step is the conduct of a TASA or Front-End Analysis (FEA).

This FEA consists of the following:

a. An equipment analysis that identifies all tasks associated with the equipment.
b. A functional analysis that identifies symptoms for faults that require troubleshooting and describes mission functions and operation of associated equipment system.
c. A task analysis that develops data for use in the preparation of technical manuals and supporting training material.

On the basis of these analyses, an identification is made of the tasks that will be covered in operator and maintenance manuals. For each task selected, a behavioral analysis is conducted and various data are generated. The procedures for accomplishing these activities have been discussed under Event B2 (page IV-6), and guidance is provided in the DARCOM/TRADOC Technical Documentation and Training Acquisition Handbook, May 1977 (Draft) and the DARCOM/TRADOC Integrated Technical Documentation and Training Preparation Guide, June 1978.

The foregoing activities should be familiar to the contractor. In most instances the contractor for FSED phase will be selected from those competing during DVAL phase of the LCSMM. Therefore, the contractor already will have prepared TASA data for his versions of the materiel system. Event C1b activities involve updating this data on the basis of an advanced version of the materiel analyzed during DVAL.

During Phase II the contractor also was probably involved in the development and revision of the ICTP. During this event (C1b) the ICTP prepared during Phase II should be updated to reflect the latest TASA data.

The updated TASA and the updated ICTP should undergo proponent review, first by the training developer and then jointly by the training and materiel developers. During the joint review, agreement should be reached regarding which tasks will be covered by SPA material and which will be covered in other portions of the training system. For the revised ICTP the reviewers should agree on (a) those portions of the training support package to be prepared by the training and the materiel developers, respectively; (b) the need for

and the general procedures for acquiring training devices; and (c) the role of the combat developer in preparing or assisting in the preparation of collective training programs and draft ARTEPs.

The contractor will identify individual operator and maintenance task requirements and those collective tasks performed by two or more operator/maintenance personnel. The combat developer, as an in-house effort, should develop/update the inventory of collective tasks and assure that data pertaining to these tasks, especially crew performance standards, have been updated in accordance with the latest concept of equipment employment and organizational structure.

INPUT DATA/EVENT DATA BASE

Description: Task and Skill Analysis (TASA) data prepared during Event B2 and updated during Event B19; FSED contract.

Data Source: TASA should be obtained from materiel developer; ICTP from training developer; and the contract from the system PM.

When Available: Depends on equipment development schedule. TASA reports (updates) should be appearing about six months after award of FSED contract.

Access Procedures: Request from materiel or training developer as appropriate.

OUTPUTS AND END PRODUCTS

Description: See descriptions for Events B2.

Output Usage: Used to prepare all training programs and material, develop plans for evaluating training programs/material, revise personnel requirements as necessary, verify training device requirements, and provide an overall plan for the development of the training support system.

Availability Requirement: About 18 months before DT II.

REFERENCES

AR 700-127, Integrated Logistic Support
DARCOM Supplement #1 to AR 700-127, Integrated Logistic Support
TRADOC Regulation 351-4, Job and Task Analysis
TRADOC Circular 351-4, Job and Task Analysis
TRADOC Circular 351-8, Individual and Collective Training Plan
                            for Developing Systems
TRADOC Pamphlet 350-30, Interservice Procedures for Instructional
                            System Development

TRADOC Pamphlet 351-4, Job and Task Analysis Handbook
DARCOM-TRADOC Handbook, Technical Documentation and Training
Acquisition
MIL-STD-1388-1, Logistic Support Analysis
MIL-M-63035(TM), Front-End Analysis

3.   EVENT C1c--DEVELOPMENT OF TRAINING SUPPORT PACKAGE (TSP)

OVERVIEW

Purpose. During OT II the complete training support package must
be evaluated. Portions of this package were prepared for OT I, and
the remainder of the package is now developed in draft form. Event
C1c describes portions of the total training package prepared by the
trainer/combat developer. Those portions prepared by the materiel
developer are discussed under Events C2a through C2c.

Relation to LCSMM/IPS Events. Event C1c is part of the activities
subsumed under Event C1 of the IPS model and Event 46 of the LCSMM
model, preparing for OT II/DT II in Events C3 and C4.

TSM/POC Responsibilities. Portions of the total training support
package are developed respectively by the training developer and the
materiel developer. The TSM/POC is responsible for coordinating these
activities to assure that all training requirements are covered,
duplications are avoided, extension training material (ETM) developed
by the materiel developer is used whenever possible by the training
developer, and all collective training requirements/material are
passed on to the material developer so that they can be incorporated
into New Equipment Training (NET) courses. The TSM/POC should assure
that production schedules are established and adhered to. He also
should monitor the development and validation of training material.

Phasing. This event should start immediately after Event C1b is
completed. That event should terminate with an agreement between the
materiel and training developers as to the elements of the training
support package each is to develop. Event C1c activities must be
completed about six months prior to OT II.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C1c

The training support package is part of the test support package,
preparation of which was discussed under Event B4 (pages IV-12).

Early in the development and validation phase of the LCSMM, the
system proponent and materiel developers reach agreement on those ele-
ments of the total training package to be prepared by each.

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Essentially, the materiel developer prepares technical manuals, SPA materials, and new equipment training courses, and oversees the development of training devices. The trainer/combat developer prepares all other components of the total training package that the materiel, training combat developers will use as the basis for their training programs, the TASA data, and updated ICTP produced during Event C1b.

The training developer is primarily concerned with preparing individual training programs for new MOS specialties or inputs to existing appropriate individual training programs. In particular, the training developer is responsible for training related to common tasks (e.g., tasks performed over a variety of equipments) and tasks associated with "generic skills" (e.g., use of test equipment). The training developer also prepares training material covering individual tactical training requirements.

The combat developer is responsible for the preparation of collective training material. This includes the preparation/revision of field manuals, "how to fight" manuals, and training circulars. The combat developer also is responsible for the preparation of ARTEPs. The appropriate draft ARTEPs should be available for OT II.

TRADOC Circular 351-8 describes the major training products that must be prepared for OT II. The OTEA Test and Evaluation Handbook is quite specific as to when these products should be available in outline form (12 months prior to OT II) and in detailed form (six months prior to OT II). Descriptions of the products developed by the training proponent follow.

    a.   <u>Institutional Training Courses</u>. These courses are seldom needed prior to OT II. However, their POIs should be available before OT II because they are used to conduct NET courses for OT II participants. As appropriate, these courses should include training for individual and collective tactical tasks. For OT II, collective training for units/crews is most likely to be provided by an initial NET team. The POI and training material used by this team must be approved by the training proponent.

    b.   <u>Army Correspondence Course Program (ACCP)</u>. The tasks or jobs to be included in correspondence courses will be identified in the ICTP. The POI for these courses must be developed prior to OT II. If non-resident instruction is designated as a prominent part of training system personnel, then draft ACCP lesson material should be ready for evaluation during OT II.

    c.   <u>Army Training Literature Program</u>. Field manuals, "how to fight" manuals, training circulars, and similar

publications are prepared as part of this program. Field
and "how to fight" manuals are used to teach both individual
and collective tactical tasks. Draft versions of these
manuals should be prepared prior to OT II.

d. **Soldier's Manuals (SM) and Job Training Books (JTB).**
Soldier's Manuals and Job Training Books are developed by
the material developer as part of the Extension Training
Material for the SPA. For OT II, Soldier's Manuals and Job
Training Books do not need to exist as such. However,
SPA/ETM material developed for and evaluated during OT II
eventually is repackaged to become SMs and JTBs. The SMs
will contain a listing of high-risk tasks for each MOS along
with standards of performance, references and training
material, and related information. This information is
derived from the TASA data developed by the contractor. The
JTBs contain ETM first prepared by the contractor in support
of technical manuals. The tests developed to assess the
effectiveness of ETM eventually become the Skill
Qualification Tests for the tasks in the Soldier's Manuals.

e. **Training Extension Courses (TEC).** The Soldier's Manuals/
Commander's Manuals/SQT approach to training is designed to
provide an integrated training package structured around a
soldier's job. An extension training course is similar to a
course prepared for institutional training and is structured
around an MOS or a duty position. When the ICTP indicates
that extension training courses will be used, a draft POI
and lesson material for these courses should be available
for OT II.

f. **Collective Training (CT) and Army Training and Evaluation
Program (ARTEP).** In preparation for OT I, high-risk
collective tasks were identified and draft FMs and "how to
fight" manuals were prepared. In preparation for OT II,
collective training requirements and training materials must
be expanded and refined. This should have been accomplished
during the process of updating the ICTP (Event C1b). The
updated ICTP should contain an expanded/revised collective
training concept for both institutional and unit training,
to include training for trainers and training managers
(Instructor and Key Personnel course) and training for oppo-
sition force units, battle simulation, and command staff
units. The detailed package prepared for OT II (and IOC)
should include updated/revised FMs and "how to fight"
manuals. As part of TEC development, a draft ARTEP should
be prepared by the combat developer.

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TRADOC Circular 351-8 outlines the procedures for establishing schedules and development milestones for each of the products described above. Preparation of these schedules involves backward planning for each product. TRADOC Circular 351-8 also lists many of the references which provide guidance for preparing components of a training support package. Guidance regarding the preparation of lesson material and training courses for individuals is quite well developed, but similar guidance for collective training exists only in *rudimentary form*.

Preparing the training support package often involves the acquisition of sophisticated training devices, especially maintenance simulators. Acquisition of such devices is discussed under Event C2c.

INPUT DATA/EVENT DATA BASE

Description: The updated TASA data and ICTP developed during Event C1b; also, training requirements as described in the Acquisition Plan and the FSED contract. Recommendations for training contained in the evaluation report for OT I also may provide useful inputs.

Data Source: Documents cited above.

When Available: Should be available when Event begins, or at least no later than nine months following award of FSED contract.

Access Procedures: Request from either training or materiel developer.

OUTPUTS AND END PRODUCTS

Description: A variety of training programs/courses/packages/ training literature as described in preceding text. See also descriptions in TRADOC Circular 351-8.

Output Usage: Outlines of training programs/courses are used to prepare training portion of Test Design Plan for OT II. Detailed training POIs/material/tests should be available six months prior to OT II so that they can be used to prepare training portion of Detailed Test Plan. Programs/courses are used to train instructors for OT II; they in turn use material to train OT II participants. Refined versions of programs/courses/material become the training support system for the developing materiel.

Availability Requirements: In outline form, 12 months prior to OT II. In detailed form, six months prior to OT II.

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REFERENCES

AR 71-5, Introduction of New or Modified Systems/Equipment
            (to be replaced by AR 350-XXX)
TRADOC Circular 70-1, Training Device Development
TRADOC Circular 350-3, Individual/Collective Training and
                        Development Glossary (TBP)
TRADOC Circular 351-3, Individual Training Plan (TBP)
TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRDOC Circular 351-5, SQT Policy and Procedures

4.   EVENT C1d--TEST AND EVALUATION PLANS/PROCEDURES FOR DT/OT II

OVERVIEW

Purpose. The purpose of Event C1d is to develop plans for eva-
luating DT/OT II test issues. The event begins with the preparation
of a rather general Independent Evaluation Plan and terminates with
the preparation of a Detailed Test Plan for controlling the DT/OT and
collecting and processing test data.

Relation to LCSMM/IPS Events. This event is part of Event C1 of
the IPS model and Event 46 of the LCSMM model. DT/OT II cannot be
conducted until Event C1d has been accomplished.

TSM/POC Responsibility. The TSM/POC coordinates the preparation
of the DT/OT inputs developed by the combat developer, the training
developer, LOGCEN, ADMINCEN, and other TRADOC agencies as appropriate.

Phasing. This event begins about two years prior to DT/OT II and
must be completed prior to DT II.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C1d

The development of test evaluation plans and procedures has been
discussed under Event B4 (pages IV-12).   DT II includes an assess-
ment of whether the draft training material is ready to enter the pro-
duction phase. Also assessed are the human engineering aspects of
the material and associated aspects of training devices. OT II provi-
des for the evaluation of the materiel in terms of its effectiveness
and military worth and its total logistic support package, to include
all training support material.

The process of preparing for a DT/OT involves the preparation of
four documents as depicted in Figure V-2. These documents are an
Independent Evaluation Plan (IEP), an Outline Test Plan (OTP), a Test
Design Plan (TDP) and a Detailed Test Plan (TDP). These plans are
based on the identification of critical test issues. For major

OPERATIONAL TEST AND EVALUATION CYCLE

Figure V-2. Operational Test and Evaluation Cycle

systems these issues are identified by a task force or by a *study/advisory group*. For non-major systems, critical issues for testing are identified by a COEA study group, the combat developer, the training developer, and other agencies as appropriate. Issues that should be evaluated during OT II include (a) those which could not be evaluated or resolved during OT I, (b) those related to the effectiveness of collective training material, and (c) those related to training device effectiveness.

The training proponent will develop training issues for the OT. The designated tester will determine which of these issues can be subjected to test and will develop a list of test parameters. The training proponent then will prepare test criteria, especially the standards that should be met during the test.

The training proponent prepares or assists in preparing the IEP and the OPT. For OT II the test plan should require the assessment of pre-OT group training. This training should be conducted by military instructors and data should be collected to assess its effectiveness. A critical OT II test issue concerns the ability of OT II player personnel to perform required tasks to a specified level of proficiency. Another OT II test issue concerns the capability of collective training material to prepare units to the point where they can perform proficiently in an ARTEP.

The training developer will be called upon to prepare or assist in preparing detailed plans for data collection and for data processing. Example V-1 illustrates some of the test objectives which usually are developed for assessing training and personnel requirements.

In preparation for OT II, operator personnel may be trained with SPA/ETM material. If deficiencies in this material are identified during training, an attempt should be made to correct them before they are used in preparing for OT II. The material should undergo a second assessment during its use for training OT II personnel.

As noted under Event C2c, training devices may be acquired as part of the materiel system or may be acquired separately under their own TDR/TDRL. In either case TRADOC will be responsible for planning for and conducting the DT/OT for the device, unless DA has designated the device as a major system. Even in this latter case the training proponent is responsible for developing he test issues and plans for evaluating the device.

INPUT DATA/EVENT DATA BASE

Description: Test issues and evaluation guidance located in the Acquisition Plan; test issues and test plans prepared by the

materiel developer, training developer, logistician, and other
appropriate agencies; issues developed for further test following
OT I (see Event B8, page IV-31). As the plans become more
detailed, inputs include the outline of training programs and
draft POIs and eventually include detailed lesson and testing
material.

Data Sources: Appropriate documents, draft POIs, etc. as
described above.

When Available: To be established by Test Study Group. All
training material is required in detailed form about six months
prior to OT II. Outlines of training courses should be available
about 12 months prior to OT II.

Access Procedure: Request from designated DT/OT test agency.

OUTPUT AND END PRODUCTS

Description: A detailed set of plans for conducting DT/OT II,
to include the sequence of events, control procedures, data
collecting procedures, and data analysis procedures. See descrip-
tion for Event B4 (pages IV-12).

Output Usage: Used to control the conduct and data analysis for
DT/OT II.

Availability Requirement: Must be available by the scheduled
time for training all the various participants for DT/OT II.

REFERENCES

AR 70-10, Test and Evaluation during Development and Acquisition
         of Materiel
AR 71-3, User Testing
OTEA, Operational Test and Evaluation Handbook
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition
         of Major Systems
Mitre Corporation, A Guide for TRADOC System Managers.

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EXAMPLES AND ILLUSTRATIONS

A sample test objective statement from the OTEA Operational Test and Evaluation Handbook (Objective 3, Figure 4.2) is reproduced as Example V-1.

5. EVENT C2a--DEVELOPMENT OF SPA MATERIAL

OVERVIEW

Purpose. The purpose of this event is to develop operator and maintenance manuals. In support of these manuals, Extension Training Material (ETM) is developed for tasks that cannot be fully described in the manuals.

Relation to LCSMM/IPS Events. This event is a continuation of Event C1a.

TSM/POC Responsibility. SPA material is developed by the materiel developer, usually under contract. The TSM should have joint responsibility for monitoring these developmental activities.

Phasing. SPA material must be ready prior to the scheduled date for training of OT II player personnel.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C2a

The SPA development process is "directed towards developing an integrated package of technical documentation and training which provides the soldier with the exact information and skills--and only those--needed for on the job performance." The SPA package consists of (a) technical documentation that provides the soldier with all the information he needs for on-the-job performance of those tasks; and (b) ETM designed to teach and develop proficiency in task performance and in the use of technical documentation.

The development of SPA material has been extensively described in DARCOM/TRADOC publications referenced at the end of this section. The process begins with a Front-End Analysis (FEA) performed in consonance with logistic analysis requirements as described in MIL-STD-1388-1. The new materiel is first subjected to an equipment analysis which identifies all operator and maintenance tasks. For each task a

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OBJECTIVE 3: Training. To assess the adequacy of the training program and proposed personnel selection criteria.

SUBOBJECTIVE 3.1: To provide training data.

MEASURES: 3.1.1 - Distribution of student test scores (GT, hearing, sight, A/C recognition test, system proficiency test - after initial training and at end of OT).

3.1.2 - Proportion of persons requiring additional instruction.

3.1.3 - Summary of students' recommended changes to training POI.

3.1.4 - Summary of instructor's identification of main problem areas in training.

3.1.5 - Plot of learning curve. (Reaction time under systematically controlled conditions).

SUBOBJECTIVE 3.2: To provide personnel selection data.

MEASURES: 3.2.1 - Distribution of student test scores (GT, hearing, sight).

3.2.2 - Distribution of student personnel data (TIS, age, formal education, military schooling, MOS, time in that MOS, time in current organization, expressed job interest).

3.2.3 - Proportion of personnel failing to complete training.

3.2.4 - Observed reasons for failure to complete training.

3.2.5 - Concensus of key personel concerning any attributes distinguishing highly proficient ZAP personnel from lesser proficient personnel.

Example V-1. Sample of Test Objective Statement

functional analysis is performed to define equipment operations in terms of functional operations and data flow. Each task then is further analyzed to identify skill, informational, and training requirements, job performance standards, and so on. This process is the same as described for Event B2 (contractor-prepared TASA, page IV-6) and the result is an extensive inventory of tasks for all operator and maintenance positions. It is assumed that each of these tasks will be described in either operator or maintenance technical manuals. In preparation for inclusion in these manuals, a behavioral analysis is performed on each task to develop more detailed information about task performance conditions, initiating cues, performance standards, and so on.

The task inventory is analyzed further to identify tasks in need of support by training material. For each of these tasks training objectives are established, criterion tests are developed, the most appropriate training methods and presentation methods are selected, and an associated set of task-oriented training materials are developed and verified. All of these activities occurred during the DVAL phase for high-risk tasks.

SPA materials are developed by the materiel contractor and it can be assumed that, for developing systems, much of the analytic activities just described were accomplished during Phase II, especially during Event B2. In Event C1b the TASA data were updated as was the ICTP developed during Phase II.

Contractor FEA activities provide a task list for each level of maintenance and operator logistical support requirements. To complete this activity a list of collective and tactical tasks must be developed by the combat developer. Strictly speaking, this aspect of the analysis effort is not part of the SPA effort. However, it is imperative that the output of the SPA FEA be integrated with the task inventory provided by the combat developer, so that both the materiel and the training developers will have a complete system task list on which to base their respective training programs. This list of tasks and its associated data provide the basis for the development of institutional and unit training programs by the training developer, and new equipment training programs by the materiel developer.

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The next major development in the SPA process is the preparation of operator and maintenance technical manuals. Prior to OT I the material developer contractor will have provided a "synoptic outline" of each TM to be produced and preliminary documentation and storyboard training material for high-risk tasks. This material, mostly training material for high-risk tasks, underwent initial validation during OT I. In preparation for OT II this material must be updated and new material generated for lower risk tasks. Following development of major blocks of technical material, it should undergo validation by contractor personnel.

While technical manuals are being developed, extension training material to support selected tasks also is being developed. This ETM material, which is primarily self-instructional, provides training on those tasks difficult to fully describe in the TMs. In addition, the ETM material may provide instruction directed toward acquiring proficiency in the use of the TMs.

TM/ETM material should be validated as a package. However, during the initial development of the TM it is useful to determine whether experienced personnel, following the TM to the letter, can accomplish the required task. If they can, this indicates that all the important elements of the task have been adequately described and in the correct sequence. To validate the TM/ETM package, one should determine whether typical user personnel can (a) meet training objectives following study of ETM material; and (b) meet task standards using TM material after undergoing training on related ETM.

During development of draft ETM material, the contractor should conduct individual and small group trials. The SPA/ETM package should then be submitted for government review, for appropriateness of content, clarity of presentation, and completeness. After revision, the material should undergo large group trials by being used to train OT II player personnel. When possible, government personnel should conduct this training.

SPA material usually is the first training material to be developed for a new system; therefore, its use in other elements of the

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total training system should be considered. Most ETM will have application for new equipment training, institutional, and non-resident courses. Since ETM is task oriented, most of it is applicable for SQT training.

INPUT DATA/EVENT DATA BASE

Description: Updated TASA data and OICTP developed during Event C1b.

Data Source: OITCP and inventories of tasks selected for training.

When Available: About 18 months prior to DT II.

Access Procedures: Obtain from materiel developer.

OUTPUTS AND END PRODUCTS

Description: A series of technical manuals and associated ETM, for all operator and maintenance positions required of the developing system.

Output Usage: SPA material is used to train personnel for OT II. The material is incorporated into New Equipment Training programs and may be used in institution training programs.

Availability Requirement: Prior to OT II training, preferably when draft NET and institutional courses for OT II are being prepared.

REFERENCES

AR 700-127, Integrated Logistic Support
DARCOM Supplement #1 to AR 700-127, Integrated Logistic Support
TRADOC Regulation 351-4, Job and Task Analysis
TRADOC Circular 351-8, Individual and Collective Training Plan
           for Developing Systems
TRADOC Pamphlet 350-30, Interservice Procedures for Instructional
           System Development
TRADOC Pamphlet 351-4, Job and Task Analysis Handbook
DARCOM/TRADOC Handbook, Technical Documentation and Training
           Acquisition
MIL-STD-1388-1, Logistic Support Analysis
MIL-M-63035, Front-End Analysis

6.   EVENT C2b--NEW EQUIPMENT TRAINING (NET) FOR DT/OT II

   OVERVIEW

      Purpose. During OT II the training support package must be
   assessed. The key test issues concerned whether the training material
   is effective, and cover the correct group of tasks for each operator
   and maintenance position. New Equipment Training provides a means for
   testing the training support package and for preparing DT/OT II player
   personnel.

      Relationship to LCSMM/IPS Events. Event C2b is part of Event 50
   of the LCSMM, and a continuation of Event C2a.

      TSM/POC Responsibility. The NET package will be developed by the
   materiel developer. The training proponent/TSM should be responsible
   for obtaining instructor personnel for training during NET. Also, the
   TSM/POC should assure that NET includes collective task training as
   developed by the combat developer. Both the materiel and the training
   developers prepare elements of the training support package for OT II.
   The TSM/POC should assure that this development is conducted and that
   the two training packages are mutually supporting and collectively
   cover all training requirements.

      Phasing. Follows Event C2a.

   GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C2b

      This event is a continuation of Event C2a, during which technical
   manuals were prepared and ETM was prepared in support of selected
   tasks described in the manuals. During Event C2b SPA material is com-
   bined with additional training material into draft training courses.
   These courses should be MOS oriented and should cover, for each opera-
   tor and maintenance position, the individual and collective tasks
   which must be mastered by job encumbents.

      Early in this event a list of collective tasks that must be
   learned by individuals and by units is obtained from the combat deve-
   loper. These tasks, combined with a list of individual tasks for each
   MOS, then are used to prepare a trial POI for each MOS. The training
   developer must approve this trial POI since it will become the basis
   for institutional courses, as well as for NET courses. The POI outli-
   nes the integration of all training devices, aids, and lesson material
   developed both by the materiel developer (SPA material) and by the
   training developer (FMs, lesson material on common tasks, etc.).

      In preparation for OT II, military instructors will be trained.
   These persons then will conduct training for OT II player personnel.

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To accomplish this the materiel developer must develop Instruction and Key Personnel (I&KP) courses.

The development of instructional material for I&KP/NET training must include tests for assessing both individual and collective training. In addition to SPA test material, ARTEPs should be prepared for assessing collective training. ARTEP development is the responsibility of the combat developer.

Instructional elements of NET courses should be validated prior to their use in preparation for OT II. Validation procedures are included in documents and Military Standards that describe the development of SPA material.

There is some uncertainty as to whether SQT tests and associated training material (Job Training Packages) should be available in draft form for OT II. Job Training Packages consist of training material plus guidance material for the trainer/supervisor. The packages are prepared by the combat developer and used to assist individuals or units conducting training away from the TRADOC institutional setting. The training is directed at obtaining proficiency on tasks listed in the Soldier's Manual for a particular MOS. Job Training Packages and related SQTs should be available in draft form for evaluation during player training for OT II.

INPUT DATA/EVENT DATA BASE

<u>Description</u>: Updated TASA data and updated ICTP from Event C1b.

<u>Data Source</u>: Updated LSA reports from contractor and latest revision of ICTP.

<u>When Available</u>: About nine months following award of FSED contract.

<u>Access Procedure</u>: Request from training developer.

OUTPUTS AND END PRODUCTS

<u>Description</u>: An Instructor and Key Personnel course for teaching military personnel how to train system operators and maintenance personnel, using trial POI and draft technical manuals, ETM, training aids and devices, and other materials (simulated targets, etc.) which have been developed for operator or maintenance training.

<u>Output Usage</u>: Used to train military instructors who in turn will use components of courses to train OT II players.

Eventually, much of I&KP course material will be incorporated
into institutional courses or into New Equipment Training courses.
The detailed versions of these portions of the NET package deve-
loped for OT II are required inputs to the preparation of a
Detailed Test Plan by the designated operational tester.

Availability Requirement: Should be available in outline form
18 months prior to OT II, and in detailed form six months prior
to OT II.

REFERENCES

AR 71-5, Introduction of New or Modified Systems/Equipment
TRADOC Circular 70-1, Training Device Development
TRADOC Circular 350-3, Individual/Collective Training and
                         Development Glossary (TBP)
TRADOC Circular 350-XXX, Collective Training Plan (TBP)
TRADOC Circular 351-3, Individual Training Plan (TBP)
TRADOC Circular 351-4, Job and Task Analysis (TBP)
TRADOC Circular 351-5, SQT Policy and Procedures
TRADOC Circular 351-8, Individual and Collective Training
                         Plan for Developing Systems
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition
               of Major Systems
Reference Letter, ATTSC-DS-DPA, 6 February 1979, Standard
                         Training Paragraphs for Requirements
                         Documents and Operational Test Training Issues
Navy Training and Evaluation Group, A Technique for Choosing
                         Cost-Effective Instructional Delivery Systems,
                         TAEG No. 16.

7. EVENT C2c--TRAINING DEVICE ACQUISITION

OVERVIEW

Purpose. During this Event a prototype training device(s) is
acquired.

Relationship to LCSMM/IPS Events. This event is part of LCSMM
Event 50 and ILS Event C2.

TSM/POC Responsibility. The training device is acquired by the
materiel developer. However, the training developer is responsible
for preparing the functional specifications for the device and for
evaluating it (Training Device DT/OT) before it is used to train OT II
player personnel. The TSM/POC coordinates the interactions between
the training and materiel developers, and coordinates delivery of the
device(s) to TRADOC, and so on.

Phasing. The training device(s) should be available about 12 months prior to OT II. This requirement may be difficult to meet and portions of the DT/OT for the device may have to be conducted at contractor facilities.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C2c

The process by which training device requirements are developed has been described under Event B18 (page IV-58). To summarize, training device requirements are tentatively identified, then incorporated into the system LOA. The AD contract specifies that training device requirements be further identified and a brassboard prototype be developed for high-risk tasks prior to OT I. After training device requirements are validated during OT I, the requirements are defined in more detail and incorporated into the ROC (B20), the Phase III Acquisition Plan (B24), and the FSED contract (C1a). The contract should require that a prototype device be available prior to OT II.

Training device requirements are identified or reviewed during the various times when task and skill data and the OICTP/ICTP are updated. Procedures have not been developed to a high point, but general guidance is available in the DARCOM-TRADOC Technical Documentation and Training Acquisition Handbook and in TRADOC Circular 70-1. In addition, PM TRADE is available to provide assistance while training device requirements are identified and training device specifications are developed.

Usually the PM for the materiel system is responsible for the acquisition of training devices, with actual development undertaken by the system prime contractor or a subcontractor. The training proponent is responsible for identifying training device requirements, establishing the functional requirements for such devices, monitoring development, and conducting DT and OTs for the device. If the training device has been designated as a major system, OTEA is responsible for its testing.

As noted under Event B18, a separate set of requirements documents must be prepared if development of a training device involves a technical risk. Such devices may undergo their own DT and OT.

The steps which should be followed during development and testing of training devices in the FSED phase are as follows:

o   Translation of training device requirements into training design specifications and procurement packages
o   Solicitation and award of the training device contract
o   Fabrication of training device
o   Contractor testing of training device

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o   Government developmental test of training device
o   Contractor training of trainer device instructor/personnel
o   Training device prototype delivery to TRADOC for training
    of player personnel for OT II
o   Operational test of device (performed as prelude to OT II)
o   Preparation of production specifications and procurement package
o   Completion of CTEA on training device
o   Training device acceptance IPR

The development of training devices usually lags behind the deve-
lopment of the materiel system. Therefore, if they are to be
available when needed, the devices must be developed in a timely
manner. The early identification of training device requirements
prior to the LOA and the development of cost estimates is imperative
so that a portion of the funds for prime system development can be
allocated to acquiring the training device and to its support require-
ments. The training device contractor must have access to component
design during the early portion of the FSED phase.

DATA INPUT/EVENT DATA BASE

Description: Training device requirements will be described in a
number of documents, including the LOA, the Acquisition Plan,
and the FSED contract. In addition, the TRADOC evaluat on report
for OT I may contain comments on training device requ ements,
especially if a brassboard version of the device was evaluated
during OT I. The updated ICTP (Event C1b) will describe any
requirements that are more recent than those contained in the
system Acquisition Plan (Event B24).

Data Sources: In the documents cited.

When Available: Of the documents cited, the ICTP update is
the last to be prepared and it should be available about six
months following award of FSED contract.

Access Procedures: Request from either materiel or training developer.

OUTPUTS AND END PRODUCTS

Description: A prototype training device, to include the test
support package for the device.

Output Usage: Used to train personnel for OT II.

Availability Requirement: Must be available for scheduled DT of
training device.

REFERENCES

TRADOC Circular 70-1, Training Device Development
DARCOM-TRADOC Handbook, Technical Documentation and Training
Acquisition

8. EVENTS C3 AND C4--DEVELOPMENTAL TEST II (DT II) AND OPERATIONAL
TEST II (OT II)

OVERVIEW

Purpose. The purpose of DT II is to demonstrate that the
materiel design risks have been minimized and that the engineering
process is complete. The purpose of OT II is to demonstrate the mili-
tary utility, operational effectiveness, and suitability of both the
materiel and its support subsystems.

Relationship to LCSMM/IPS Events. These events are comparable to
Event 51 of the LCSMM. They provide the data for making the decision
for entering the production phase of the materiel acquisition process.

TSM/POC Responsibility. The TSM/POC and/or representatives of the
training proponent act as observers during DT/OT II. For non-major
systems, element of TRADOC, some elements of TRADOC conducts DT/OT II.

Phasing. DT II can begin shortly after approval of the Detailed
Test Plan. When possible, DT and OT II are conducted separately and
about six months apart. This provides an opportunity for correction
of deficiencies determined in DT II prior to OT II.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C3

For major systems the designated operational tester (OTEA) is
responsible for conducting the OT. For non-major systems some element
of TRADOC usually conducts the OT. For training devices which have
not been designated as a major system, TRADOC is responsible for con-
ducting the training device DT/OT.

During DT II the TSM/POC and representatives of the training
component function solely as observers. They should be particularly
interested in monitoring training for operator and maintenance person-
nel prior to DT II. The effectiveness of SPA/ETM material probably
will first be assessed at this time.

Prior to OT II representatives of the training community again
should monitor the training of OT player personnel. The critical test
issue during this training concerns whether the training material can
prepare personnel to perform in accordance with training standards.

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During OT II, training representatives should be especially attentive to the proficiency of operator and maintenance personnel, and the tactical proficiency of crews/units during various mission operation tests. During OT II, training representatives should begin to form judgments about another critical training issue, namely, does the training support material cover appropriate tasks that appropriate training standards?

INPUT DATA/EVENT DATA BASE

Description: Test and Evaluation plans prepared during Event C1d.

Data Source: The four test and evaluation documents prepared prior to OT II.

When Available: Prior to DT II.

Access Procedures: Request from operational tester.

OUTPUTS AND END PRODUCTS

Description: Data collected during DT/OT II.

Output Usage: Used to prepare test reports.

Availability Requirements: Must be available immediately following completion of DT or OT in the form of Test Reports from development and operational testers.

REFERENCES

AR 70-10, Test and Evaluation during Development and Acquisition
            of Materiel
AR 71-3, User Testing
OTEA, Operational Test and Evaluation Methodology Guide
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition
            of Major Systems
Mitre Corporation, A Guide for TRADOC System Managers

9.   EVENT C5--PREPARE DT II/OT II TEST REPORTS

OVERVIEW

Purpose. During this event DT and OT test results are analyzed, then reported in separate test reports. These reports provide the basis for an Independent Evaluation Report (IER) by the designated tester and for evaluation position reports by other interested

agencies. Essentially, these reports describe what must be done, if anything, before the materiel system, including its support systems, can enter the production phase of its life cycle.

Relation to LCSMM/IPS Events. Reports generated during this event, especially the evaluation reports, provide the basis for the decisions made during the third DSARC/ASARC/IPR (Event C12). Event C5 is part of Event 54 of the LCSMM.

TSM/POC Responsibility. The DT and OT Test Reports and the evaluation reports which follow are prepared by OTEA and/or an element of TRADOC. The TSM/POC should assist interested TRADOC agencies to obtain the test reports and other data inputs necessary to develop their evaluation reports. Also, the TSM/POC is responsible for staffing the training proponent and logistician reports within TRADOC and for assuring that the approved reports are forwarded to the DSARC/ASARC/IPR committee.

Phasing. This event should begin immediately after OT II and should be completed, except for staffing requirements, within two months.

PROCEDURES FOR ACCOMPLISHING EVENT C5

Immediately following DT and OT II the designated testers for those activities prepare a Test Report. This Test Report (TR) describes the conditions under which the test was conducted and the findings that resulted from the test. Also, the TR describes any departure from the Detailed Test Plan, the reasons for such departures, and their impact on the reliability and validity of the test data.

The data presented in the Test Report will be organized around test objectives developed for OT. These objectives were derived from issues or questions relating to the suitability of the test support packages provided for OT II (OT I also). These test support packages are:

- o Maintenance Test Support Package
- o New Equipment Training Test Support Package
- o Doctrine and organizational Test Support Package
  - Means of Employment
  - Organization of Employing Units
  - Logistical Concepts
  - Mission Profile
  - Test Settings
- o Threat Support Package
- o Training Support Package (provided by training proponent)

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Following preparation of the TRs, the reports are distributed to the various TRADOC agencies that were involved in preparing the OT test plans. Each of these agencies reviews the findings for its area(s) of concern and prepares a command position. For example, LOGCEN should review data pertaining to logistical concepts; the combat developer should review data related to means of employment, and so on. These positions are comparable to those prepared by the designated Independent Evaluator (OTEA) for major systems. However, the Independent Evaluator must prepare a formal IER covering all aspects of OT II while other interested agencies prepare an evaluation report covering only their areas of concern.

In the process of evaluating the OT findings, the DT test report should be reviewed, as well as data from any other Test and Evaluation activities which might not have been part of a DT or OT.

Reviewing and evaluating DT and OT provides the basis for judging the suitability of support packages. A decision must be made as to whether components of these packages need to be revised and undergo further development and test, or whether their further development and production can proceed as planned. To arrive at this decision some general questions should be asked with respect to each component of a support package. The following questions are illustrative:

a.   Were test plans followed? Were certain tests incomplete, omitted, conducted under unanticipated conditions or less than satisfactory conditions? Reliability and validity of the test data are assessed on the basis of answers to these and similar questions.

b.   Were all training objectives and subobjectives met? If not, why? Were training materials available for test? If they were not, subsequent testing may be required. Were player personnel representative of target population? Unsatisfactory results may be due to the use of player personnel who did not meet selection criteria. Conversely, if player personnel were overqualified, training data may be inflated.

c.   Were instructors properly trained? Apparent deficiencies in training material or selection criteria may be due to poorly trained instructors. Evaluation of training components should be based in part on an observation of NET prior to OT II and a review of the POI employed during NET.

d.   Were performance test procedures faulty? In some instances procedures for conducting performance tests cannot be implemented as planned, or test/performance recording procedures are inadequate. This is especially likely for trial ARTEPs.

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e. Were training criteria set at too low or too high a level? If persons who performed poorly during pre-OT training perform acceptably during the OT, this might indicate that training criteria may be too high. On the other hand, if persons who undergo successful training cannot peform satisfactorily during the OT, then 1) training standards may be too low, or 2) training for any particular MOS and skill level may not cover all required tasks.

f. Were training materials/devices/POIs, etc. deficient? When training programs/material cannot prepare persons to meet training objectives, deficiencies usually exist in the material/program.

As already noted in this handbook, several critical training objectives/issues which must be assessed during an OT, especially during OT II. These are:

a. Can the training programs/material train persons to meet training standards?

b. Can persons who meet training standards meet field performance requirements?

Some important training subobjectives include: Can SPA/ETM effectively train operator and maintenance personnel? Does effective performance on training devices correlate with effective field performance?   Does training on training devices transfer to the equipment?

In general, in an evaluation report emphasis should be on those objectives and subobjectives that were not met. The foregoing questions may help detect the reasons for such failures. Means of correcting the deficiencies should be proposed, and the degree to which the means/technical fixes will be successful should be estimated.

Following preparation of the OT II test report and all independent evaluation reports, the CTEA/COEA for the training approach must be updated (AR 70-10). Also, for those training devices being developed under a TDR/TDLR, a CTEA update should be prepared. This activity can be performed as part of Event C9.

The OT II evaluation reports prepared by the training/combat developer, the logistician, and others are staffed throughout TRADOC and eventually become command positions. Draft versions of these position papers can be forwarded to OTEA or whoever is the independent tester. The final command position is forwarded to members of the DSARC/ASARC/IPD committee. As a final step in preparing these posi-

tion reports the training developer will be required to recommend continuation of type classification of the system from a training point of view.

INPUT DATA/EVENT DATA BASE

Description: Test data collected during DT II and OT II. For major systems and systems of special interest, the Test Reports will be prepared by the material developer (DT report) and by OTEA (OT report). These reports will serve as inputs to TRADOC agencies which should prepare an evaluation report for their area(s) and interests.

Data Source: As noted above.

When Available: Data from DT and OT are available immediately after test completion. Test reports describing/summarizing these data are available one month following test completion.

Access Procedures: Test data for preparing Test Reports are obtained directly from the test data collection team. Test Reports are obtained from the DT tester (usually some element of DARCOM), from OTEA (for major systems), or from an element of TRADOC if the system is a non-major one.

OUTPUTS AND END PRODUCTS

Description: For DT and OT, respectively, a Test Report that summarizes all data collected in support of test objectives, and an Independent Evaluation Report. In addition, the training developer, combat developer, and logistician usually will prepare separate evaluation reports covering selected components of the materiel support package.

Output Usage: The reports, especially the IEP, are used by the DSARC/ASARC/IPR committee to decide whether the material will enter a production stage or must undergo further development and testing. The reports also are used to update training plans and prepare a final QQPRI, a final Basis of Issue Plan, and an updated Acquisition Plan.

Availability Requirement: The Test Reports should be available one month following completion of OT II. The evaluation reports should be available in draft form two months following OT II.

REFERENCES

TRADOC Regulation 350-2, Development, Implementation, and Evaluation of Individual Training

TRADOC Circular 351-8, Individual and Collective Training
Plan for Developing Systems

<u>EXAMPLES AND ILLUSTRATIONS</u>

See Illustrations for Event B7, page IV-26.

10. EVENT C6--FINAL QQPRI AND MOS DECISIONS

<u>OVERVIEW</u>

<u>Purpose</u>. The purpose of this event is to provide the Qualitative
and Quantitative Personnel Requirements Information in final form to
MILPERCEN so that that agency can plan to acquire the necessary per-
sonnel for Initial Operational Capability (IOC).

<u>Relationship to LCSMM/IPS Events</u>. This event is not specifically
recognized in AR 11-25 but is contained in LCSMM Event 60, Update
Acquisition Plan.

<u>TSM/POC Responsibilities</u>: The final QQPRI is the responsibility
of the materiel developer but input is required from the combat and
training developers that represents the final TRADOC reevaluation of
the MOS decisions.

<u>Phasing</u>. The final QQPRI is developed by the materiel developer
approximately 30 months prior to IOC and must arrive at MILPERCEN at
least 27 months before IOC. The MOS decisions must be announced by
MILPERCEN 24 months prior to IOC.

<u>GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C6</u>

The specific procedures and responsibilities for preparing the
final QQPRI are presented in AR 611-1. The issues for consideration by
proponent school/agency are:

   a. Are all system components and subcomponents identified and
       listed in QQPRI documentation, to include MOS and Annual
       Maintenance Man Hours (AMMH) for each level of maintenance?
   b. Is the MOS, and if appropriate ASI, proper to support equip-
       ment in proposed TOE?
   c. Are skill levels correct for the MOS and expertise required?
   d. Will training be sufficient to provide required expertise?
   e. Will there be a sufficient number of MOS-trained personnel in
       the field to support the equipment?

The areas to be addressed by the training developer with refer-
ence to the test results of OT/DT II are:

a. The subject matter and scope of instruction required by each MOS/SSI.

b. The time and resources required for the recommended training.

The TSM should coordinate the flow of information required and assure adherence to schedules.

INPUT DATA EVENT/DATA BASE

a. PQQPRI - Event B15 (page IV-46).

b. OT/DT II Test Reports - Event C5.

OUTPUT AND END PRODUCTS

a. Input to BOIPC (Events 7 and 8)

b. Input to TOE changes

c. Input to the New Equipment Personnel Requirements Summary (NEPRS)

REFERENCES

AR 71-2, Basis of Issue Plans

AR 611-1, Military Occupational Classification Structure
           Development and Implementation

DARCOM-P 700-9-1, Integrated Logistic Support in the Conceptual
           Phase

11. EVENTS C7 AND C8--CHANGES TO UNIT STRUCTURE AND PREPARATION OF BOIPC

OVERVIEW

Purpose. The purpose of these events is to prepare a final BOIP based on the information gained from OT/DT II and provided in the QQPRI. The BOIPC is a complete plan that projects the organizational placement of new items of equipment in TOD/TDA/CTA/JTA.

Relationship to LCSMM/IPS Events. Listed as Events 7 and 8 in the text and Events 6 and 7 in the supporting block diagram of TRADOC Regulation 600-4, the Unit Structure Changes and BOIP are not specifi- cally itemized in the LCSMM of AR11-25 but rather are incorporated in Event 60, Update Acquisition Plan.

TSM/POC Responsibilities. The combat developer has responsibility for preparing of the BOIPC. It is approved by DA and published/ distributed by TRADOC. The TSM/POC should monitor the schedules as the data contained in the BOIPC are required as input to other events.

Phasing. The BOIPC will be submitted 12 months prior to the type classification STANDARD (LCCA) data.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENTS C7 and C8

The BOIPC is prepared by the combat developer after receipt of the final QQPRI. Unit structures are changed as necessary on the basis of the data obtained from OT/DT II. Once approved by DA, the BOIP is published and distributed by TRADOC to be used by:

a. HDQA and materiel developer to establish quantity of item for purchase.
b. Combat developer for revising TOE.
c. Major commands for revising TDA, CTA, and JTA.

The procedures for preparing the BOIP are presented in AR 71-2, as are the input requirements for the combat and training developers. The flow chart in Figure V-3,(taken from Figure 3-6, AR 71-2) shows the interactions necessary in the BOIP process. The TSM should monitor these activities and assure that responsive schedules are met.

The TSM should monitor these activities and assure responsive schedules are met.

BOIP-II

MATERIAL DEVELOPMENT	Submits final DA Form 3362b-R and QQPRI to TRADOC
TRADOC	Develops BOIP by coordinating with TRADOC schools/centers, other cbt dev and TDA, JTA and AOP proponents as required. BOIP-II will include all requirements. Within 90 days TRADOC schools/centers and other proponents will provide requirements to TRADOC. These requirements will be reviewed/revised/ consolidated and submitted to HQDA for approval (with copy to DARCOM (EARA)).
HQDA	Approves, adjusts or disapproves and returns to TRADOC (with info copy to DARCOM and EARA).
TRADOC	Publish if approved. Provides HQDA, DARCOM (EARA) and interested activities copies. EARA provides DARCOM activities copies.
TC LCC-A	BOIP-II is a prerequisite for TC and is included in IPR package.
Proponents	Includes the item of equipment in documents reflected in the BOIP (para 2-16).
TRADOC	After the BOIP has been applied to all documents (para 2-17c); TRADOC will request HQDA to re-tire the BOIP to history file.
HQDA	Retire BOIP to history file.

(Source: AR 71-2, Figure 3-6.)

Figure V-3. Flow Chart for BOIPC

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INPUT DATA/EVENT DATA BASE

a. QQPRI - Event C6
b. OT/DT II Test Reports - Event C5
c. BOIPT - Event B16

OUTPUT AND END PRODUCTS

The output of this event the BOIP is used to prepare the necessary TOEs and to plan for the acquisition of the designated amount of equipment.

REFERENCES

AR 71-2, Basis of Issue Plans
AR 71-9, Materiel Objectives and Requirements
AR 310-31, Management System for Tables of Organization and
        Equipment
AR 611-1, MOS Description and Implementation
DARCOM Regulation 11-27, Life Cycle Management of DARCOM
        Material

12. EVENT C9--UPDATE TRAINING PLAN

OVERVIEW

Purpose. During this event an updated ICTP is prepared. This plan contains changes in training plans and support requirements made necessary by OT II findings.

Relationship to LCSMM Events. This event is part of Event 57a of the LCSMM model. It provides the training inputs for preparing the updated plan for acquiring the training support system.

TSM/POC Responsibility. The training proponent prepares the updated plan. The TSM/POC provides assistance as requested.

Phasing. Event C9 should begin shortly after the training proponent's evaluation report for OT II is prepared. It should be completed as soon as possible, preferably within two months, so that it can impact on on-going training development activities.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C9

During OT II a variety of training materials, devices, and one or more POIs are evaluated. Procedures for correcting identified deficiencies should be incorporated into the updated ICTP. Are the specifications for training materials and devices acceptable? If not, they

should be modified. Is the training strategy developed in support of the materiel acceptable? Has the proper mix and sequence of institutional and unit training been identified? If the evaluation report suggests otherwise, necessary changes should be made and incorporated into the updated ICTP (see Events B12 and B17, page IV-39 and IV-55).

During Event C9 considerable emphasis should be placed on preparing for the development of institutional training courses. Plans should be refined for obtaining instructors and for sending them to Instruction and Key Personnel training courses. The degree to which the contractor-developed, and TRADOC-approved, POI is used for training OT II personnel should be assessed and modified if required. Attention should be given to identifying those SPA/ETM materials that can be used in institutional courses.

LSAR data, lists of collective and individual tasks, draft SQT tests, etc., should be reviewed to determine whether they can be modified for use in institutional training. This data/material should be used whenever possible.

The foregoing activities should result in an updated, more detailed version of the ICTP prepared during Event B17. This ICTP must be further updated by examining training support requirements. Estimates of requirements for instructors, facility, training aids, ammunition, ranges, etc. should be updated.

Finally, if these were not already prepared as part of B4, an updated CTEA/COEA should be prepared.

While the training proponent, is undertaking the above activities, the materiel developer is updating plans and requirements for new equipment training. Updated NET plans, to include support requirements, must be incorporated into the revised ICTP.

INPUT DATA/EVENT DATA BASE

Description: ICTP prepared during Event B17; the most recent TASA data provided by the contractor; all OT II evaluation reports and position papers; and DT II IERs.

Data Sources: As described above.

When Available: All data should be available at time Event activities begin. However, if the IER for DT II recommends major changes in the materiel, then this event (C9) cannot be completed until data, especially LSA reports, reflecting these changes are available.

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Access Procedures: The ICTP can be obtained from the training proponent; all DT and OT reports should be obtainable from the materiel developer and OTEA/training developer, respectively. LSA reports can be obtained from the contractor or the materiel developer. As noted above, these reports may not reflect recommended materiel changes based on DT II findings.

OUTPUT AND END PRODUCTS

The output of this event is an updated ICTP for use in final cost estimates of the system and in planning training.

REFERENCES

TRADOC Regulation 350-2, Development, Implementation, and
　　　　　　　　　　　　　Evaluation of Individual Training
TRADOC Circular 351-8, Individual and Collective Training Plan
　　　　　　　　　　　　　for Developing Systems
TRADOC Pamphlet 350-30, Interservice Procedures for Instruc-
　　　　　　　　　　　　　tional System Development
TRADOC Pamphlet 351-4, Job and Task Analysis Handbook
ARI-TR-78-A7, TSM Guide to Training Development and Acquisition
　　　　　　　　　　　　　of Major Systems

13. EVENT C10--UPDATE ACQUISITION PLAN (AP)

OVERVIEW

Purpose. The Acquisition Plan (AP) is the document that contains the basic data for preparation of the Decision Coordinating Paper (DCP) for ASARC/DSARC III. A decision on full-scale production will be based on the data, plans and projections it contains. This event in the IPS is directed toward updating the requirements in two Sections in the AP, IV and V.

Relationship to LCSMM/IPC Events. Event C10 corresponds directly with Event 60 of the LCSMM.

TSM/POC Responsibilities. The preparation of the Acquisition Plan is the responsibility of the materiel developer, usually DARCOM, in coordination with the TRADOC proponent and the TSM. The TSM should review all supporting material, most of which was developed during preparation of the ROC, and ensure that the input data are consistent and the latest available.

Phasing. This Event should be completed three months prior to the ASARC review meeting and therefore 12 months prior to the scheduled ASARC III.

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GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C10

The procedures for preparing the Acquisition Plan are presented in AR 70-27 and AR 700-127. In Event C10 the training developer is responsible for developing inputs to Sections IV and V, as follows:

o   Section IV.   New and updated support testing requirements.

o   Section V.   New and updated planning for any further testing and instruction, individual, and crew training anticipated.

The TSM should assure that any changes in training plans made as a result of the data gathered and evaluated during OT/DT II are incorporated into the AP.

If the prospective production contractor will be tasked to train the initial personnel (i.e., the first and/or second battalion fielded), then the training developer must make certain that he will have constant interaction with that contractor, by incorporating standard contract paragraphs in the production RFP to enable him to obtain training data and evaluate procedures during the production phase.

INPUT DATA/EVENT DATA BASE

a.   Test Reports OT/DT II - Event C5
b.   Training Plan - Event C9
c.   BOIPC - Events C7/C8
d.   QQPRI - Event C6
e.   AP - Event B24

OUTPUT AND END PRODUCTS

The output of this event is the basic information needed to prepare the DCP and associated documents for decision at ASARC/DSARC III.

REFERENCES

AR 15-14, System Acquisition Review Council Procedures
AR 70-1, Army Research, Development and Acquisition
AR 70-27, Outline Development Plan, Development Plan, APM, DPM,
        and DCP
AR 700-127, Integrated Logistic Support
TM 38-703 Series, Integrated Logistic Support
TM 38-710, Integrated Logistic Support Implementation Guide

EXAMPLES AND ILLUSTRATIONS

See AR 70-27 and AR 700-127.

14. EVENT C11--PREPARE DRAFT TOE

OVERVIEW

Purpose. The purpose of this event if to identify those changes in the draft TOEs developed for OT II that are necessary to fulfill the mission as stated.

Relationship to LCSMM/IPS Events. This event, although not specifically referenced in AR 11-25, is incorporated in LCSMM Event 59.

TSM/POC Responsibilities. The development of the TOE(s) is the responsibility of the combat developer as is the incorporation of any changes. The TSM/POC should assure the information flow described below and monitor the schedule of required submissions.

Phasing. The incorporation of changes is an iterative process but the final drafts must be completed for incorporation into the AP.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C11

The incorporation of changes, if any, in TOE(s) dictated by the evaluation of OT/DT II data is an iterative process. Significant coordination is required with those responsible for preparation of the final QQPRI and BOIP. Though it appears as the last event in Phase III of the IPS, the final results of this event must be reflected in Event C6, QQPRI. This obviously requires interaction between the combat developer and materiel developer to ensure consistency.

The TSM should assure the information flow and maintain the schedules described in Events C6 and C7.

INPUT DATA/EVENT DATA BASE

a. AP - Event B24
b. Test Reports OT/DT II - Event C5
c. QQPRI - Event C6
d. BOIPC - Events C7/C8

OUTPUT AND END PRODUCTS

The output of this event is the draft final TOE(s) for distribution by TRADOC, once approved, to the units for planning the introduction of the new system.

REFERENCES

AR 71-2, Basis of Issue Plans
AR 310-31, Management System for Tables of Organization and
Equipment (The TOE System)
AR 570-2, Organization and Equipment Authorization Tables--
Personnel

15. EVENT C12--ASARC/DSARC/IPR III

OVERVIEW

Purpose. This event is the decision process required for production and deployment of the new system.

Relationship to LCSMM/IPS Events. This event is the same as Events 71 and 98 of the LCSMM.

TSM/POC Responsibilities. The TSM will continue as a member of the working group that prepares for the ASARC and prepares the DCP from the data, plans, and projections in the AP.

Phasing. Approximately 4 to 6 months prior to a scheduled milestone (I, II, or III) decision for an OSD major system, the DSARC will initiate action to request a milestone meeting. Approximately 11 months prior to a scheduled ASARC, the ad hoc planning meeting will be held and an agenda for the ASARC will be established as an enclosure to the ODCSRDA guidance directive, AR 15-14.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT C12

The procedures for this event are well documented in AR 15-14, and Appendix C of that document, the Milestone III checklist, is presented in Examples V-2. It should be noted that with the current emphasis on collapsing the development cycle as much as possible, some of the events in this text have been revised and combined. If there is no requirement for an OT/DT IIa or III, then the final recommendations of all agencies must be based on the results of OT/DT II. This includes the final decisions on training plans and devices.

INPUT DATA/EVENT DATA BASE

The input to this event is the information contained in the Acquisition Plan, plus any peripheral studies and dissenting opinions submitted directly to the ASARC review committee.

OUTPUT AND END PRODUCTS

The output of Event C12 is a decision to acquire the system as recommended, delay until further tests are completed, or stop production because of a change in threat, mission technology, or other critical factors.

REFERENCES

DODD 5000.1, Major System Acquisitions
DODD 5000.2, The Decision Coordinating Paper (DCP) and the
            Defense Systems Acquisition Review Council (SARC)
DODD 5900.26, Defense Systems Acquisition Review Council (DSARC)
AR 15-14, Systems Acquisition Review Council Procedures

EXAMPLES AND ILLUSTRATIONS

The Checklist for Milestone III Reviews (Appendix C, AR 15-14) is reproduced in Example V-2.

CHECKLIST FOR MILESTONE III REVIEWS
(END FULL-SCALE-ENGINEERING DEVELOPMENT PHASE,
BEGIN PRODUCTION AND DEPLOYMENT PHASE)

The following items will be reviewed at Milestone III:

a. *Need.* The mission element task is reaffirmed to be essential.

b. *Threat.* The updated threat is credible. addresses the correct timeframe, has been validated by CG Commander, INSCOM, in coordination with ACSI, and, when appropriate, by DIA.

c. *Recommended System/Program Alternative.*

(1) Satisfies the mission element need(s).

(2) Is most cost-effective alternative.

(3) Is within established constraints.

(4) Is affordable.

(5) Provides for NATO standardization and interoperability.

(6) Balances cost, schedule, and performance effectively through tradeoff.

d. *Operational Factors.*

- (1) Force structure plan and schedule for phase-in; AAO and distribution plan.

(2) Impact on Reserve Components.

(3) Impact on MOS structure and individual training.

(4) Use of simulators for individual and unit training.

(5) Performance goals and thresholds reaffirmed.

(6) Disposition of current family or series equipment being replaced or phasedout.

e. *Logistical Factors.*

(1) Minimize O&S costs.

(2) Minimize maintenance and support personnel.

(3) RAM goals and thresholds reaffirmed.

(4) ILS planning to meet needs of operational units.

f. *Cost.*

(1) Validity of cost estimates, including COEA costs.

(2) Design-to-cost (DTC) goals and thresholds reaffirmed for—
   (a) Hardware design-to-cost.
   (b) O&S cost.

g. *Acquisition Strategy.* Has been updated and is being executed.

(1) Business planning supports the acquisition strategy and provides flexibility for production rates and quantities when options are used.

(2) Issues concerning production, producibility, quality assurance, and facilities are identified and managed satisfactorily.

(3) Requisites defined for future production decisions.

(4) Competition; second source.

h. *Schedule.* Goals and thresholds reaffirmed.

i. *Testing.*

(1) Results of DT/OT II support recommendations.

(2) Adequacy of testing, critical issues remaining to be resolved, quality of test efforts, validity of test results, and plan for further testing.

j. *Production Readiness Review Completed.*

k. *Program Management Structure.*

l. *TJAG Legal Review.* Consistent with international law.

Example V-2. Checklist for Milestone III Reviews

SECTION VI

IPS MODEL:
PRODUCTION AND DEPLOYMENT

A. OVERVIEW

During the Production and Deployment Phase, operations and main-
tenance personnel are trained, system deficiencies identified in
testing are corrected, equipment is procured and distributed, and
logistic support is provided. The training activities involve the
full-scale implementation of resident and unit training programs.
During the Production and Deployment Phase the major training activi-
ties are:

o   Determining quantity of production of training materials and
     devices
o   Field testing the program(s)
o   Updating the training plan(s)
o   Implementing the program
o   Evaluating and revising the program
o   Providing inputs to LCSMM events as required

For those systems where a decision has been made to conduct DT/OT
III, additional activities may include: preparing a test plan and a
test support package, evaluating OT III results, and updating the
ICTP, CTEA/COEA and Acquisition Plan.

B. SCOPE

The scope of the training activities in the full-scale production
phase includes all activities necessary to provide trained operator
and maintenance personnel in sufficient quantity and of sufficient
quality to allow the first operational troop unit to perform its
mission. These activities are described in the discussion of the
following events, leading from the ASARC/DSARC III decision to
Initial Operational Capability (IOC).

1. EVENT D1--REVISE AND PUBLISH TOE(s)

OVERVIEW

Purpose. The purpose of this event is to update the TOE(s)
based on the evaluations of the data obtained during OT II.

Relationship to LCSMM/IPS Events. Event D1 of the IPS is
directly related to Event 100 of the LCSMM.

TSM/POC Responsibilities. The combat developments activity of
the proponent school has the responsibility of modifying or updating
any TOEs based on new information gained during OT II. These revisions
will be submitted according to AR 310-31.

Phasing. The revised versions of the TOE(s) will be submitted to
DA and to other interested commands and agencies as soon as possible
after ASARC/DSARC approval of full-scale production.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT D1

The general procedures for revising and publishing the Tables of
Organization and Equipment are described in AR 310-31. The only input
the trainer has to this event is to ensure consistency with the ICTP
if training devices are included.

INPUT DATA/EVENT DATA BASE

a. Draft Plan TOE
b. ASARC/DSARC III recommended changes

OUTPUTS AND END PRODUCTS

Table(s) of Organization and Equipment to be used to plan quan-
tity and phasing of full-scale production.

REFERENCES

AR 71-2, Basis of Issue Plans
AR 310-31, Management System for Tables of Organization and
          Equipment (The TOE System)
AR 570-2, Organization and Equipment Authorization Tables--
          Personnel

2. EVENT D2--DOCUMENTATION IN TAADS/CTA

OVERVIEW

Purpose. The purpose of this event is to ensure that all pertinent
data about the equipment is added to The Army Authorization Documents
System (TAADS) data base.

Relationship to LCSMM/IPS Events. Event D2 of the IPS is
directly related to Event 103 of the LCSMM.

TSM/POC Responsibilities. Unless HQDA (DCSOPS) requires an update
in the input to the BOIPC, there is no TSM/POC function.

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Phasing. If no update is required, this event will begin immediately following ASARC/DSARC III. If an update is required DCSOPS will designate suspense dates.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT D2

The general procedures are described in Army Pamphlet 11-25 and summarized below.

a. Proponents of MTOE will document requirements upon receipt of published TOE or TOE changes.

b. HQDA (DCSOPS) either will notify proponents of TDA to update or will add the equipment to the TAADS data base in accordance with the approved BOIPII without input from the proponent.

c. CTA proponents will document BOI upon type classification of the item.

d. When constraints are imposed on the distribution of equipment, HQDA (DCSOPS) will notify proponents of actions that will be required to update unit TAADS documents.

INPUT DATA/EVENT DATA BASE

a. TOE(s)
b. BOIPC
c. ASARC/DSARC recommended changes

OUTPUTS AND END PRODUCTS

Updated TAADS data base and associated documents for use in Army planning activities.

REFERENCES

AR 310-34, Equipment Authorization Policies and Criteria, and Common Tables of Allowances
AR 310-49, The Army Authorization Documents System (TAADS)

3. EVENT D3--RESIDENT TRAINING

OVERVIEW

Purpose. Prior to IOC the training proponent is concerned with establishing resident training programs, meeting training facilities requirements, supplying training support materials, and identifying

support staff. As appropriate, the training and support staff members are prepared by sending them to an Instructor and Key Personnel course (part of the New Equipment Training program). Before training is initiated, students must be recruited or assigned from other duties. In preparation for IOC, institution and unit training programs are implemented, with unit training often conducted by NET teams. Collective and tactical training for units is based on draft ARTEPs and trial field manuals, "how to fight" manuals, and so on. Following IOC the ARTEP is evaluated, then finalized; the Skill Qualification Test program is implemented, as are plans for the continuing evaluation of the training programs.

Relation to LCSMM/IPS Events. Resident training programs should be implemented prior to Initial Operational Capability (IOC). Most other elements of the training system also should be implemented prior to IOC. Elements of the Skill Qualification Test (SQT) program require implementation within 12 months after IOC.

TSM/POC Responsibilities. The TSM/POC functions primarily as a coordinator and expediter during the implementation of training programs. With respect to resident training, the TSM/POC should assure that schedules are maintained and that course development personnel consider the use of training materials developed by the contractor, DARCOM, TRADOC, etc. This step is taken to prevent duplication of effort. Many other elements of the training system may require TSM/POC assistance as a coordinator. These are listed in TRADOC Circular 351-8 and include development of correspondence courses, field manuals, "how to fight" manuals, training circulars, training devices, etc.

Phasing. Appendix D, TRADOC Circular 351-8 contains product-oriented planning schedules for all major elements of a training subsystem. Course POIs must be submitted to HQ TRADOC for approval 27 months prior to IOC. If new facilities are required, construction requirements should be submitted to MACOM five years prior to the requirement date for the facilities.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT D3

During Event D3 a variety of training-related products must be developed and implemented in addition to resident training programs. These products, and suggested "Development Milestones" for each, are described in TRADOC Circular 351-8, Appendix D. In Table VI-1, these products are listed under the agency, DARCOM or TRADOC, which has the prime responsibility for their development.

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TABLE VI-1

LIST OF TRAINING-RELATED PRODUCTS DEVELOPED DURING PHASE IV OF LCSMM

<u>DARCOM</u>

Skill Performance Aids (SPA)
Training Devices (with TRADOC)
New Equipment Training (NET)

<u>TRADOC</u>

Institutional Training Courses
Army Correspondence Course Program (ACCP)
Army Training Literature Program (ATLP)
Commander's Manuals (CM)
Soldier's Manuals (SM) Job Books (JB)
Skill Qualification Test (SQT)
Training Extension Course (TEC)
Dept. of Army Audiovisual Production Programs (DAAPP)
Facilities, Ranges and Real Property
Training Ammunition
Collective Training (CT) and Army Training and
    Evaluation Program (ARTEP)
Cost and Training Effectiveness Analysis (CTEA)

As noted in TRADOC Regulation 600-4, a number of actions must have occurred before resident training can start. These include:

a. Final MOS decision announced by DCSPER/MILPERCEN.
b. TOE approved by DA (DCSOPS), personnel requirements and schedule of training inputs (ARPRINT) determined by DCSPER.
c. NET, including training literature and SPA material, completed (AR 350-XXX).
d. Final approval of ICTP by DCSPER.
e. Training equipment, aids, and devices issued.

Resident training will be conducted by a cadre of personnel trained by the materiel developer as part of the NET program. The Instructor and Key Personnel program prepared by the materiel developer should be in place in draft form prior to OT I and should receive its final evaluation during preparation for OT II. The TSM/POC should ensure that suitable types and numbers of persons are sent to this course.

Units that first receive the new equipment are usually trained by new equipment training teams. Members of the unit are taught to perform individual operator and maintenance tasks with the assistance of SPA material. Tactical and collective tasks are taught in accordance with a specific Army Training and Evaluation Program (ARTEP). A test edition of the ARTEP and its collective training (CT) support package must be prepared, produced, and distributed prior to IOC. During the following 12 months, the ARTEP and CT are then evaluated.

Within 12 months following IOC, a Skill Qualification Test program should be implemented. The material for this program is prepared by the training developer and consists of Soldier's Manuals, Commander's Manuals and Skill Qualification Tests.

The production and development of training materials and devices usually will be accomplished under a contract which specifies a phased procurement. After prototype material and devices have been developed, validated, and approved, and a production and deployment decision made, the contractor will be notified to initiate quantity production of the material and devices.

Once sufficient quantities of materials and devices have been produced, they should undergo a field test. During such tests complete training packages should be used to train operator and maintenance personnel, and the operational effectiveness of the training program should be assessed. This process ensures that the prototype material has been converted to a product that meets operational requirements. As needed, the material should be revised and revalidated.

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Following completion of the field tests, it may be necessary to revise the ICTP to reflect modifications in training plans and schedules.

The foregoing activities are followed by implementation of the training program. This activity involves preparing for and conducting the training program(s) at each of the training locations (resident and/or unit) specified in the training plan. To accomplish this, the necessary resources must be assembled, the instructional staff prepared, students processed into the program, and so on. As needed, continued logistical support for the program must be arranged.

After the program(s) becomes operational, plans for its continuing evaluation and revision must be initiated. These activities involve: (a) conducting internal and external evaluations of the program; (b) identifying changes in field requirements; and (c) revising the program to reflect program deficiencies and/or field requirement changes. TRADOC Pamphlet 350-30 describes the general procedures for maintaining instructional programs.

<u>INPUT DATA/EVENT DATA BASE</u>

a. Most recent ICTP

Description. *This document, prepared during Event C8,* describes the latest training plan and support requirements.

<u>Data Source</u>: Most recent ICTP should be attached to most recent version of the Acquisition Plan.

<u>Access Procedures</u>. Obtain copy of Acquisition Plan or request ICTP from TRADOC.

b. All draft training materials and prototype devices prepared to date

<u>Description</u>: Material will include TMs and SPA material, draft NET program material, and any relevant material already in use in a training program.

<u>Data Source</u>: SPA material, TMs, and NET programs prepared by contractor; existing (and relevant) TRADOC courses (institution and correspondence).

<u>Access Procedures</u>: Request from materiel developer and from appropriate TRADOC schools.

c. Latest Task and Skill Analysis (FEA) Data

Description: Material consists of updated version of the FEA data produced during Event B3.

Data Source: Logistics Support Analysis Reports plus other data sheets containing task and skill analysis data.

Access Procedure: Request from materiel developer.

OUTPUTS AND END PRODUCTS

All training courses, devices and training-related products/requirements cited in ICTP.

REFERENCES

TRADOC Circular 351-8, Individual and Collective Training Plan for Developing Systems: Policy and Procedures
TRADOC Pamphlet 350-30, Interservice Procedures for Instructional System Development.

4. EVENT D4--INITIAL OPERATIONAL CAPABILITY (IOC)

OVERVIEW

Purpose. The purpose of this event is to establish a date by which production equipment, trained personnel and logistic support will be adequate for the first troop unit to perform its assigned mission.

Relationship to LCSMM/IPS Events. Event D4 of the IPS is the same as Event 105 of the LCSMM.

TSM/POC Responsibilities. The TSM/POC responsibilities for this event are incorporated in all the preceding events. The most pertinent for the trainer at this LCSMM point is the accomplishment of the schedules associated with Event D3.

Phasing. The phasing of this event is system dependent.

GENERAL PROCEDURES FOR ACCOMPLISHING EVENT D4

Essentially, the procedures for accomplishing this event are to successfully accomplish all the preceding events. At this point in the LCSMM, the materiel system and all supporting subsystems should come together to establish an operational capability for the first troop unit designated to employ the system. The unit must be ade-

quately supported in the field in such areas as maintenance, repair parts, documentation, and training. The training requirements are for operational institutional training and appropriate unit training exercises.

INPUT DATA/EVENT DATA BASE

The development process.

OUTPUTS AND END PRODUCTS

The first operational unit.