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ARI TECHNICAL REPORT

TR-78-A30

LEVEL II

TEC Media Alternatives for the FY 78-83 Period

by

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and L. A. Silver

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

Army planners realize that the current TEC (Training Extension Course) concept may be unduly restrictive considering the wide range of delivery systems available or potentially available for Army individual-collective training at unit levels. In order to provide Army training developers with a broader base and useful aids for determining delivery systems for a variety of training requirements, three interrelated user products were designed, developed, and documented.

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Block 20 (Continued)

The first of these, a Procedure Guide ~~(published as ARI P-78-3)~~, (AD-A068045), assists the developer in deciding on, selecting, and/or developing the best of Army delivery systems for both an overall training program and for each of its lesson modules. Complementing this volume is the Delivery Systems Data Base (ARI P-78-4), an expandable document which currently indexes the pertinent characteristics of 42 Army delivery systems (members), grouped into 12 "Families." The Data Base may also serve as an independent reference document on Army delivery systems ranging from standard classroom aids, through training devices, to system-embedded training, tactical engagement simulations and command/staff battle simulations. To illustrate the combined use of these two documents for a representative set of Army training requirements, a ~~Sample Application to the~~ Fire Support Specialist (MOS 13F) function of a Fire Support Team (FIST) was also designed and is published as ARI P-78-5. (AD-A068 047).

This report provides an overview of the above mentioned developmental work, results, and products along with recommendations for future research and product refinements. The products themselves have been oriented toward Army training and evaluation program requirements and delivery systems projected for the FY 78-83 period.

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FOREWORD

This product-oriented research was conducted by the System Development Corporation (SDC) for the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) under Amendments P00002 and P00003 to Contract Number DAHC 19-76-C-0027, the Effectiveness of Alternative Media in Conjunction with TEC for Improving Performance in MOS Related Tasks. The period of performance was 1 July 1977 through 23 March 1978.

The present work has built upon TEC media products and FY 78-83 planning studies completed for ARI in conjunction with USAFAS in the prior contract period, documented by ARI TR 77-A20 and ARI TR 78-A3.

The Procedure Guide for Delivery Systems Selection (published as ARI P-78-3) and the Delivery Systems Data Base (ARI P-78-4) are intended for application to a variety of TRADOC proponent school training support requirements in the FY 78-83 period. The MOS 13F/FIST Sample Application (ARI P-78-5) illustrates application of the Procedure Guide and Data Base to a particular USAFAS training support requirement.

This report is the final of three technical reports generated from HRN 77-185 sponsored by USAFAS. It consists of the basic report and three annexes: Procedures Guide, Data File and Sample Application. Report #1-ARI TR 77-A20, "The Effectiveness of Alternative Media in Conjunction with TEC for Improving Performance in MOS-related Tasks," was published December 1977, Report #2-ARI TR 78-A3, "Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY 78-83 Period," was published February 1978.

The precursors to HRN 77-185 were two previous HRNs, 76-205 initiated by the Combat Arms Training Board and an unnumbered HRN initiated in FY 75 by the U.S. Army Infantry School. It was anticipated in FY 77 that the USAIS could provide necessary support for their HRN, however, changing priorities prevented the Infantry School from providing the required support.

The USAFAS was acquainted with the research capability of ARI through ARI contributions to the TACFIRE Program and was receptive to the potential value of an HRN which would support computer aided instruction with application to training in artillery weapon systems.

Brigadier General Albert B. Akers, Deputy Commandant of the USAFAS, directed the development of HRN 77-185 which provided USAFAS support. Colonel John S. Crosby (now BG Crosby - Director Personnel Information Systems, U.S. Army Military Personnel Center) as Director, Course Development Field Artillery School Brigade, provided guidance, assistance and support for the ARI research effort at the Field Artillery School. Colonel Crosby's Directorate provided the personnel and logistic support which enabled ARI to accomplish the necessary research for these reports.

ACKNOWLEDGMENTS

The System Development Corporation (SDC) wishes to acknowledge the contributions made by U.S. Army military and civilian personnel to the planning and data collection which enabled the resulting products for Army users. In addition, a number of SDC personnel contributed to the data collection and product review.

Because of the numerous contributors, we have elected to identify the contributions of all under the "Project Participants" heading, pages 8 and 9, within the report.

Our thanks for special contributions on this task to:

U.S. Army Research Institute

Mr. James Baker
Dr. Leon Nawrocki
Mr. Frank Farrell
Mr. Arthur Marcus

U.S. Army Field Artillery School

Col. Thomas J. P. Jones
Maj. John A. Evans
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EXECUTIVE SUMMARY

PURPOSE

This report is addressed to TRADOC operations training supervisors and system proponency managers, and to Army Research Institute (ARI) applied human factors research scientists. It provides an overview of the developmental work, results, products, and recommendations that can assist Army training developers in specifying requirements for and making decisions on an appropriate mix of delivery systems[1] for various training support requirements. The products consist of a procedure guide and data source on Army delivery systems, supported by an example illustrating their application to representative Field Artillery training requirements. The products have been oriented toward Army training and evaluation program requirements and delivery systems projected for the FY78-83 period.

BACKGROUND

The overall purpose of the Army's TEC Media Program is to determine effective and efficient means of providing exportable training to field forces. The Army recognizes for planning that the TEC (Training Extension Course) concept could employ a full range of alternative delivery systems; however, momentum has unduly restricted TEC products. There are many delivery systems[2] other than those normally associated with TEC. This suggests that the notion of TEC exportability be broadened to include a wide array of delivery systems ranging from cardboard mockups, to part-task trainers, system-embedded training[3], remote telecommunication access to computer based materials, combined arms tactical engagement simulations[4], and command staff battle games.

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[1] "Delivery System" is defined as any technique containing media and methods for the presentation, response, feedback, and management of individual or collective training and evaluation requirements.

[2] Knerr, C. S., Downey, R. G., Kessler, J. J., Training Individuals in Army Units: Comparative Effectiveness of Selected TEC Lessons and Conventional Methods, ARI, Research Report 1188 (AD A022034), December 1975.

[3] Germas, J. E., Baker, J. D., "Embedded Training: Using a Tactical Computer to Train Tactical Computer Operators". Paper presented at Sixth Congress of the Intn'l. Ergonomics Assn., College Park, Md., 11-16 July 1976.

[4] ATSC. Bulletin 6221-77, Tactical Engagement Simulation: Experiential Learning. Army Training Support Center, 1977.

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However, there is little sense in considering alternative delivery systems unless there is evidence of exportability, effectiveness and efficiency to operations training supervisors. Similarly, proponent TRADOC schools must be able to provide the courseware and in other ways support use of the delivery system by field forces. Evidence continues to build indicating the feasibility and utility of a variety of delivery systems to Army training personnel.[1]

METHOD

A frame of reference and preliminary four-stage delivery systems decision model[2] served as the point of departure for the present work, as modified by joint agreements on product goals with ARI and USAFAS.[3] The present effort then involved: (1) proceduralizing the front-end analysis and design stages of delivery system requirements specification and decisions, (2) collecting data on specific Army delivery systems for FY78-83 and organizing these into a delivery systems data base; and (2) developing an application example using available USAFAS data on Fire Support Specialist (MOS 13F) duties and interactions as part of the Fire Support Team (FIST). The latter served both to integrate the procedure and data base, and to illustrate how the products work with a representative set of individual and collective training requirements.

RESULTS

This work has resulted in the following products for Army training developers and course designers:

- Procedure Guide for specifying delivery system requirements based upon type of program and associated constraints, requirements of the personnel subsystem to be trained, methods and settings for initial training and sustaining practice, and individual-collective task training requirements. The eight procedural steps assist the developer in making and recording interim decisions and final rationale;

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[1] cf. Hoyt, W. G., Bennik, F. D., Butler, A. K., The Effectiveness of Alternative Media in Conjunction with TEC for Improving Performance in MOS Related Tasks. ARI TR-77-A-20, December 1977.

[2] Bennik, F. D., et al Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY78-83 Period. ARI TR 78-A-3, February 1978.

[3] Bennik, F. D. "Memorandum of Understanding on TEC Media Task 8 Product Goals". Attachment 1 to SDC Letter of 11 August 1977 to MAJ John A. Evans and Dr. Leon Nawrocki.

first for specifying an appropriate delivery system mix for the overall training program, then to determine the specific delivery system requirements for each designed module of lessons. Using this guide, delivery systems can be selected, adapted, or newly developed depending upon the tradeoff of program training requirements with availability of appropriate delivery systems and practical constraints.

- Delivery Systems Data Base currently containing data on Army "Member" delivery systems summarized under twelve "Families". These Families contain delivery systems having both Army-wide applicability (e.g., REALTRAIN) and Branch-specific application (e.g., Arty Direct Fire Trainer). The data base is used at decision points with the Procedure Guide or, independently, as a data source. Currently in paper format, the data base is designed for ease of data look-up, addition of new member delivery systems, or inclusion of new data as required. The standard delivery system file format can also be used to specify requirements for a new delivery system in cases where the members described in the data base do not meet requirements.

- MOS 13F/FIST Sample Application provides a walk-through example to illustrate application of the procedure and data base products to a representative set of training requirements. The case used was individual and collective "Quick Fix" cross-training of MOS 13E/13C personnel to perform as Fire Support Specialist (MOS 13F) on the FIST of a Tank Company.

RECOMMENDATIONS

- The procedure needs to be applied and evaluated by Army developers using front-end analysis and design phase products of an upcoming developmental requirement. Examples suggested for this purpose include USAFAS training requirements for the long-range FIST concept, including mobile operations with the M113A1 or IFV (Infantry Fighting Vehicle), formerly MICV/TBAT II, in scout/recce missions. This would help identify shortfalls and ensure Army-wide applicability.

- The procedure could be supplemented to show how the requirements and characteristics for a new developmental delivery system could be specified using the aids provided. The current emphasis is on requirements used to select among alternatives currently available or potentially so in FY78-83. The data generated and formats provided could also be used to specify requirements for a new delivery system, including training devices.

- Enhancements to packaging could be implemented to aid users of the products. The current scope of work prevented optimal packaging; for example, overlays to aid comparison of delivery system requirements with available delivery system characteristics, or interweaving the application example into the procedure guide would ease use and enhance understanding of the data and the process.

- The data base could be supplemented to include direct data on training effectiveness of the delivery system. An item has been added to the delivery system data questionnaire (Appendix A, page A-7) to permit such an improvement.

- The data base could be expanded to include Branch-specific training devices other than those for Field Artillery. It currently contains delivery systems having applicability either Army-wide or specific to Field Artillery.

- It may be useful to mount the data base on a computer-based text editor or information retrieval system. This would permit remote access to update, add, or retrieve data on delivery systems. Advisability would depend upon predicted growth, change, and usage of the data base.

- It may be useful to mount the delivery system procedure and data base together on-computer as a decision aid to developers. An interactive user language such as PLANIT[1] could be employed to guide developers through procedural steps and decisions. The user decisions would most probably be a combination of automated and manual records. This would only be advisable after a manual verification of the procedure by Army users.

- It may be useful to add procedures which address other types of delivery system decisions. The procedure now addresses decisions made through the program design phase, including an optimal mix for the total program and for modular groups of lessons. Guidelines on how best to utilize any selected media when developing the courseware, or for the assignment of alternative resources in managing the conduct of training could also be provided.

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[1] PLANIT (Programming Language for Interactive Teaching) is a software system and flexible language permitting a variety of interactive applications such as computer-assisted training or counseling. ARI supports its installation and use in a variety of Army training settings including remote-access from posts and as an operator embedded training subsystem within the TACFIRE system at Ft. Sill.

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INTRODUCTION

PURPOSE

This report summarizes the work products from a project to develop a procedure to assist Army developers in specifying requirements for and deciding on an appropriate mix of delivery systems to meet varying Army training program requirements. A Delivery Systems Data Base was constructed to be used by the procedure at several decision points, as well as serve independently as a resource tool. A sample application using data from the Fire Support Team (FIST) MOS 13F career field was developed and applied as a walk-through example to show that the procedure is workable for a selected set of training requirements. This TEC Media work[1] is related to ARI and ARPA applied research to develop and improve Army-wide methods, procedures, and supportive user aids for Army training developers.

BACKGROUND

The training development process and user aids which facilitate development of training materials has emerged as an area of concern in the Army's attempt to operationalize and orient to Army practitioners the Instructional Systems Development (ISD) guidelines advanced in TRADOC Pam 350-30. This is due to a growing realization that application of the ISD process can be complex and a major cost factor in providing effective training to Active and Reserve units. Thus, the purpose of this task in the TEC Media work was to identify and develop procedures and associated user aids to assist TRADOC school developers in specifying requirements for and deciding on appropriate mix of delivery systems, considering the types of individual-collective training and evaluation requirements and Army delivery systems in the proximal future (FY 78-83).

Models for delivery system (method/media) requirements and selection have been developed by the Army and others, and a variety of approaches ranging from over-simplistic to very cumbersome are available. Block 3.2 of the ISD model which deals with specifying delivery systems is a case in point. Interviews with USAFAS school practitioners indicate that use of this process can be difficult and time consuming. In particular, shortfalls of Block 3.2 in the area of specifying delivery systems appear to include the following:

[1] Including Task 7 of prior contractual work, as well as the product-oriented work of the continuation task reported herein.

- Does not consider types of Army training support requirements,
- Does not deal directly with Army delivery system types or members,
- Gives insufficient weight to interaction of Army job-training settings and delivery system requirements,
- Gives insufficient weight to realism of trainee response and needs for sustaining practice,
- The eleven types of learning and learning events/activities are complex to apply as inputs,
- Does not differentiate among program level and lesson level decisions.

Delivery system requirements leading to decisions on an optimal mix of delivery systems for a training program should be the outcome of a front-end task and training requirements analysis sufficient for this purpose. Still, attempts to provide useful guidelines, procedures, and aids in this area range from "use anything on the shelf" to elaborate models of interest primarily to researchers. The general impression still evident is any of several approaches by developers: (1) solutions are self-evident; (2) too many variables to handle; (3) not enough principles and relationships established to provide useful guidance; (4) entirely policy-driven; or (5) show the practitioner all the complexities and see what happens. For example, a recent survey[1] of methods, procedures, and tools applicable to each ISD Block concludes regarding Block 3.2 (Specify Delivery System) that: "...more than any other step...hinges on decisions based upon policy. Virtually no decision is made...which does not effect several different activities, commit various resources, or affect the utilization of personnel and facilities. Decisions made...are based upon something beyond, or in addition to the evidential rightness or wrongness of a technical approach. The decisions are based upon constraints, implications, and priorities. In a word, they are based upon policy, and policy cannot be proceduralized in the form of a generalized, transportable tool or procedure for course developers." (Herein underlined for emphasis.)

Another recent report[2] presents a detailed descriptive model of the Army training and evaluation system which integrates various ISD components into a larger Army framework. While exemplary and very thorough in areas, such as personnel subsystem inputs, unit-level training requirements, and types of

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[1] Logan, R. S. A Survey and Analysis of Military Computer-Based Training Systems. Volume I-A Survey and Annotated Bibliography of Authoring Aids for Instructional Systems Development. MDC E1570, McDonnell Douglas Astronautics Company-East, February 1977, page B-73.

[2] SofTech, Inc., SofTech Contract No. 1026, The Army Training and Evaluation System, Item No. 0002AC, March 1977.

Army evaluation data this model appears to avoid the area of specifying appropriate delivery systems for training and evaluation requirements almost entirely.

On the other hand, SDC, under ARI sponsorship,[1] independently conceived four delivery system decision stages keyed directly to the events, working products and data sources available at various phases of an integrated Army materiel system and personnel subsystem life-cycle proponency model. Extension from this baseline has resulted in the specification of a delivery system decision procedure and aids of the present work, which are summarized in this document and published as standalone volumes.[2]

This developmental work required that the procedure be applicable Army-wide for use by other parties outside USAFAS. In concert with the development of the delivery system selection procedure, a need was expressed for the development of a data base that would contain capabilities and characteristics of delivery systems that were currently, as well as potentially, available for use at USAFAS. The data base would also include the delivery systems that would have potential application for users outside the USAFAS domain. It should also be expandable to allow the incorporation of new delivery systems, as well as permit ease of modification to those delivery systems already incorporated.

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[1] Bennik, F. D., et al. Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY 78-83 Period. ARI TR 78-A-3, February 1978.

[2] Butler, A. K., et al, Procedure Guide for Delivery Systems Selection, ARI, P-78-3; Silver, L. A., et al, Delivery Systems Data Base, ARI P-78-4; Benesch, M. A., et al, MOS 13F/FIST Sample Application, ARI, P-78-5.

APPROACH TO PRODUCT DEVELOPMENTS

PURPOSE

This section describes how the three user products of this work were specified, developed, and integrated--the delivery systems data base, delivery system requirements and selection procedure, and sample application of the procedure and data base. The numerous persons contributing to project outcomes are listed under "Project Participants," pages 8 and 9.

OVERALL APPROACH

The work effort for this project was defined as a logical, product-oriented extension of the previous work effort which had provided both USAFAS operations training and system managers along with Army Research Institute managers a frame of reference, preliminary decision model and developmental plan to assist in TEC concept planning for the proximal future (FY 78-83). This effort was documented as TR 78-A-3, Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY 78-83 Period. Within the body of this report (Section 6) there was a three-step work plan. The first two steps served to guide the efforts of the current activity.[1]

The goal was to provide a procedure for specifying Army delivery system requirements usable by USAFAS developers, yet suitable for Army-wide applicability, while being cognizant of the types of training requirements and the development of new delivery systems to meet individual-collective training needs during the FY 78-83 time period. In addition, a delivery system data base would be developed that would support the selection procedure but could also function as an independent reference tool. To demonstrate the feasibility of the delivery system requirements and selection procedure, and the utility of the delivery system data base, a walk-through example would be selected by initial agreement with the U.S. Army Field Artillery School.

STEP 1 - DEFINE AND CONCUR ON PRODUCT REQUIREMENTS

Step 1 of the workplan called for SDC project members to meet with ARI managers and USAFAS personnel to review the proposed approach to the task, discuss the assumptions and points of emphasis, and concur on the products that were to be produced. Meetings for these purposes were held at ARI and USAFAS on 27 and 29 July 1977, respectively.

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[1]The third step of the workplan, Pilot Implementation and Formative Evaluation at USAFAS, was not provided for within the scope of this work.

Agreement was reached among the parties participating in planning that there would be developed a delivery system selection procedure that would permit training developers, course designers/developers and other concerned personnel, such as TRADOC System Managers, to specify the requirements for and select an appropriate delivery system mix (methods/media) to meet individual-collective system and/or MOS training requirements during the FY 78-83 time period. The procedure would include a delivery systems data base that would be addressed by the procedure at several decision points. An application example to a representative USAFAS training requirement would serve to demonstrate the applicability of the procedure. MOS 13F/FIST was the sample training application selected. As part of the procedure and sample application, a suggested format and example would be provided for documenting the delivery system selection rationale.

Specific developmental guidance that was to be followed in the development of the above products included: (1) the procedure steps should permit general application, yet allow use of specific Field Artillery delivery system and training requirements input data; (2) focus on the two delivery system requirements and decision stages in system and job/MOS life-cycle proponency that are part of front-end job task analysis and design of course modules (guidance on how to best develop media materials, or on the assignment of media alternatives to trainees during implementation was beyond the scope of this project); (3) emphasize building a workable procedure and delivery system data base leading to clear statements of selection rationale; and (4) illustrate use of the procedure and data base by using representative personnel subsystem training requirements, and a selected string of individual and team tasks from the Fire Support Team (FIST) MOS 13F (Fire Support Specialist). The completion of Step 1 work efforts resulted in the preparation of a memorandum of understanding reflecting the above decisions and considerations which was submitted for review and concurred upon by the appropriate parties.

STEP 2 - DEVELOP DELIVERY SYSTEM PROCEDURE GUIDE AND SUPPORTIVE PRODUCTS

Based upon the concurred product requirements and MOS 13F/FIST data sources from USAFAS, attention turned in August 1977 to Step 2, the development of the user products.

Delivery Systems Data Base. The development of the three main project products started with the Delivery Systems Data Base since information on the specific delivery systems had to be obtained both from SDC resources and from several external Army sources. The first step was to select those delivery systems that were to be included within the Data Base. First consideration was given to those delivery systems that were currently or projected to be available at USAFAS or FA units during the FY 78-83 time period. A secondary consideration was known Army delivery systems that were under development with direct application to FA training at an institutional or unit setting. Prime

attention was given to Army delivery systems, including training devices, with Army-wide and/or FA-specific application. No attempt was made to include every possible delivery system within the Data Base. Twelve generic Families were established and specific delivery system Members were catalogued within the appropriate Family.

To secure information about the delivery systems and organize the data base so that data would be accessible and meaningful, a Delivery Systems Data Questionnaire[1] was designed which requested 15 categories of information concerning the delivery system, such as description, application, presentation, response, feedback, cost data, etc. Selected Delivery System Data Questionnaires were submitted to USAFAS; ARI; the Communicative Technology Directorate of the U.S. Army Training Support Center; and the Training Devices and Simulations Directorate, Combined Arms Training Development Activity (CATRADA) at Ft. Leavenworth.

Each recipient was asked to complete the Delivery System Data Questionnaire with as complete data as possible for the delivery systems indicated. Responses to the requests for information were for the most part outstanding and timely. The Communicative Technology Directorate, due to developmental cycle and propriety of some delivery systems data, requested that ARI complete the questionnaires where feasible. Several delivery systems were excluded from inclusion within the delivery system data base because of insufficient information (e.g., MAGLADS program devices and satellite-based systems). SDC also elected to use its own data sources to complete a number of the delivery system questionnaires and did not seek outside assistance for those particular delivery systems. The returned and locally completed Delivery System Data Questionnaires were reviewed and, based on this analysis, the structure of the Delivery System Data Base was determined and the data entered. There are currently 42 Army delivery system Members organized into 12 generic Families. Results of this effort are documented in Annex B and discussed in the User Products Overview in this report.

Delivery Systems Procedure Guide. The development of the delivery systems Procedure Guide commenced in September 1977. Several considerations were examined before a final approach was adopted:

- The procedure should be useful to training developers, course designers/developers, and other appropriate personnel.
- The procedure should utilize and indicate the minimum levels of task analysis detail required in order to determine training requirements which, in turn, drive delivery system (including training device) requirements.

[1] Refer to Appendix A for a sample Delivery System Data Questionnaire.

- The procedure should be brought into use after the front end analysis has been completed. This would permit the procedure users to have access to the task analysis products and trainee population requirements that occur as a result of or before the front end analysis.

- The procedure should take into consideration various types of program requirements and constraints (e.g., lead time, funding, training setting, training method, and ITDT new system or system retrofit coverage) as they impact upon the requirements for and selection of system mix.

- The procedure should allow the specification of a delivery system mix to proceed from a large pool of delivery system candidates to a final delivery system mix selection; first a mix for the overall training program, and then for specific module/lesson configurations.

Toward this goal, the procedure was conceived as two main activity blocks with each block containing a series of steps and substeps. Guidelines, checklists, and worksheets were to accompany the steps to aid the user in making and recording a series of decisions. The initial block would assist the user in specifying requirements for and selecting an appropriate mix of delivery systems that would meet the overall program requirement. This process would integrate the impact of overall program requirements and constraints, trainee population requirements, and subject matter characteristics on training requirements and, hence, delivery system requirements. Also, the user would be guided in the preparation of a delivery system rationale substantiating delivery system requirements for the overall program.

The second block in the procedure would utilize delivery system decisions from the first block and outputs of the course module design phase to establish the delivery system mix for each module/lesson within the program. The user would build a module requirements worksheet that indicates the presentation, response and setting conditions for each module/lesson, and then compare these requirements against the same categories of characteristics for each delivery system selected in Block I to determine a "best fit". Again, the procedure would guide the user in preparing a selection rationale for each module/lesson.

Fire Support Specialist/Fire Support Team Sample Application. In a parallel effort, work commenced on the development of the sample application that would be used to demonstrate the utility of the procedure. The Fire Support Team (FIST) MOS 13F served as the sample application; specifically, the Quick-Fix solution cross-training requirements of 13E/11C or 13B/11B personnel as the FIST of a Tank Company. As the sample application was developed, the delivery system procedure was applied using input data of the sample to ensure that the procedural steps, guidelines and checklists had applicability, were logically consistent, and to eliminate redundancy. As necessary, the procedure was modified to accommodate problem areas that surfaced when applied to the MOS 13F/FIST sample data. The sample application indicates that the procedure

can be applied and the steps proceed to a logical end result. The sample application is documented as Annex C and discussed in the User Products Overview in this report.

PROJECT PARTICIPANTS

This TEC Media project, including planning and work accomplished in the prior contractual period and continuing with planning, data collection, product development, and product review in the present contractual period was accomplished through the collective effort of the following persons:

Name	Location	Initial Planning	Data Collection	Products Reviewer
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Mr. Arthur Marcus	ARI HQs	X	X	X
Mr. Francis Farrell	ARI HQs	X	X	X
Mr. John Larson	ARI HQs		X	
Dr. Robert H. Sulzen	ARI HQs		X	
Dr. Randall C. Chambers	ARI, Ft. Sill Unit	X		
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COL Samuel A. Brown	Dir, DTD, USAFAS	X		
COL Thomas J. P. Jones	Dir, DCRDT, USAFAS	X		X
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MAJ John A. Evans	DCRDT, USAFAS	X	X	X
MAJ John L. Lambert	DTD, USAFAS	X		
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Mr. Dion S. Dow	SDC	X	X	
Mr. Bradley C. Fallentine	SDC	X	X	
Mr. Larry R. Harris	SDC			X
Dr. William G. Hoyt	SDC		X	
Mr. James R. Hutton	SDC		X	
Dr. Donald A. Kirsner	SDC	X		
Mr. Peter Leung	SDC	X		
Ms. Elene B. Maginnis	SDC		X	X
Mr. Billy R. Modisette	SDC, Ft. Leavenworth		X	
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USER PRODUCTS OVERVIEW

PURPOSE

This section provides an overview of the user products generated within this project. These user products are:

- Procedure Guide for Delivery System Selection (ARI P-78-3)
- Delivery Systems Data Base (ARI P-78-4)
- MOS 13F/FIST Sample Application (ARI P-78-5)

The procedure is developed for use by training developers, course developers and other appropriate personnel located at USAFAS, as well as other Army locations. The procedure is designed to interface with the delivery system data base at several decision points within the procedure. In addition to this function, the data base can also serve as a resource tool. The MOS 13F/FIST sample application was developed by following the procedure and completing necessary checklists and forms as required. The sample application was developed to formally shakedown the procedure during development, as well as to provide a walk-through showing users how the procedure is workable. Each developed product is more fully discussed in the following paragraphs.

PROCEDURE GUIDE COMPONENT (ANNEX A)(ARI P-78-3)

The main requirement in the procedure guide development was that it be useful for application at USAFAS, yet retain applicability for Army-wide use. The purpose of the procedure is to assist the user in arriving at an appropriate delivery system mix to meet an overall training program requirement, and then to make specific decisions for individual module/lessons within the training program. The format developed bears similarity to the Army's "Guidelines for Development of SQT" and TRADOC Pamphlet 350-31. The procedure is designed as a series of eight major steps which have been organized into two logical blocks of activity. Block I in the procedure is used to specify a required mix of delivery systems to meet the major training program requirements and constraints. Block II is designed to assist the user in determining the best delivery system mix for individual module/lesson instructional materials. The top level diagram is shown in Figure 1.

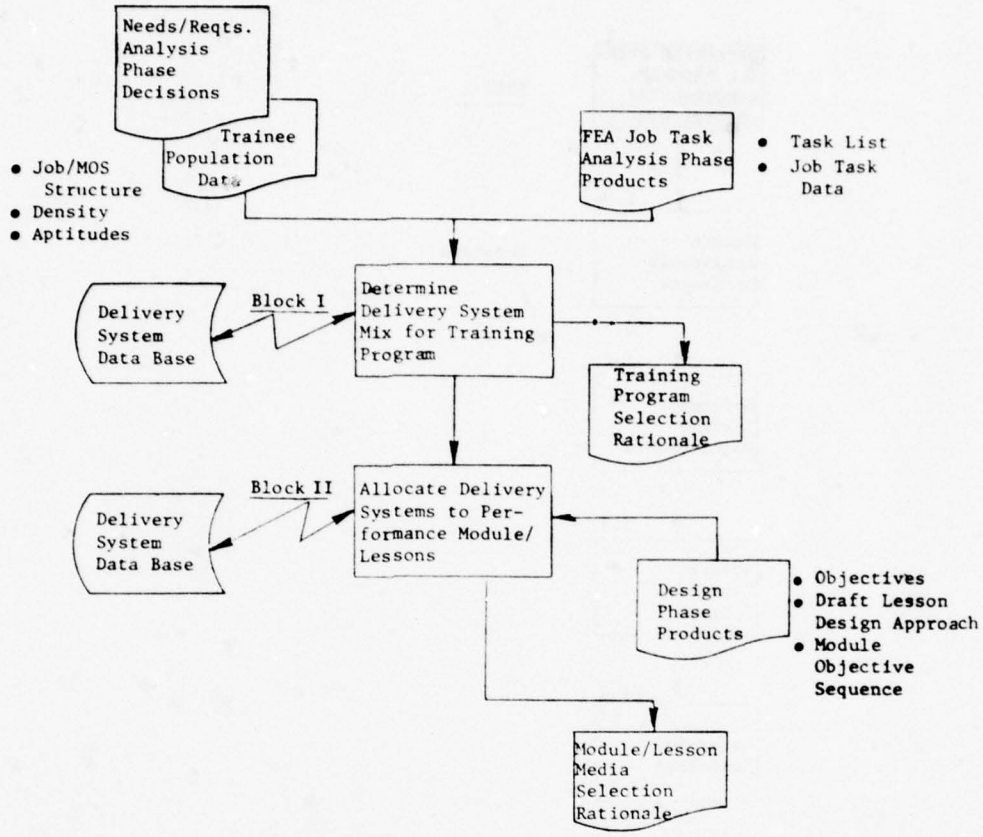


Figure 1. Delivery system requirements and selection procedure (top level diagram)

Second level flowcharts open up each block and detail the steps. The flowchart indicates the major inputs and results that pertain to the specific step. Figure 2 shows a flow chart for one of the steps. Third level flowcharts are used to identify the sequence of substeps as required. Figure 3 shows the flowchart for one of the substeps. Guidelines, checklists, and tables are used as performance aids to assist the procedure user in taking the required actions and making the necessary decisions. Figure 4 shows a sample guideline for one of the substeps.

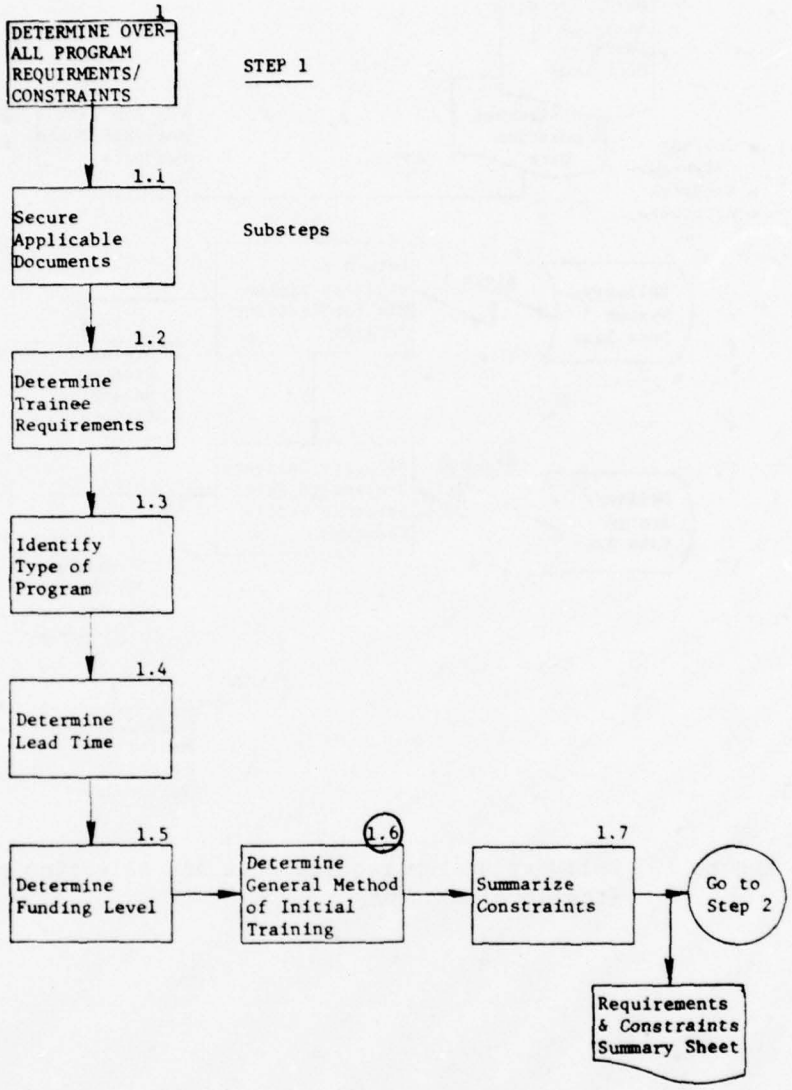


Figure 2. Flowchart for procedural step

Substep 1.6. Determine General Method(s) of Intended Training

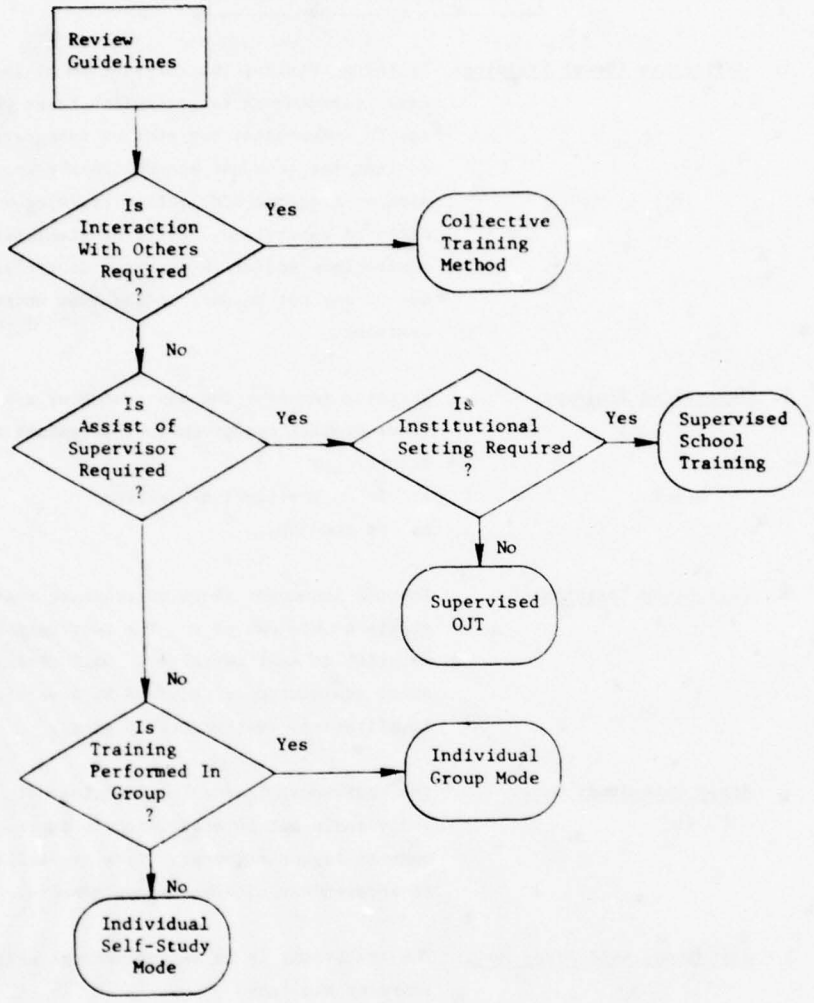


Figure 3. Flowchart for a procedural substep (1.6, Figure 2)

Training Method Guidelines

1. Collective (Team) Training: Training requires the interaction of individual team members to accomplish tasks which may be independent but must be integrated so that the team can accomplish the group task or mission. Collective training will often be supervised, requiring simulation controllers and/or recorders. Controllers may or may not be part of the team undergoing training.

2. Supervised Training: Training requires the assistance of a supervisor or facilitator while the trainee is either:
   a. in an institutional setting
   b. on the job.

3. Self-Study Training: The job incumbent receives training individually at his own pace. The instructional material is self contained. Only minimum or no assistance is required by supervisors, facilitators, instructors or peers.

4. Group Self-Study Mode: The individual learns in a setting with other individuals but interaction with other group members is not required. Task acquisition is independent of other group members.

5. Individual Self-Study Mode: The individual is in an independent setting learning the task.

Figure 4. Guidelines that accompany a procedure step (1.6, Figure 3)

The eight major steps that the procedure user performs are:

Block I - Determine Delivery System Mix for Training Program

1. Determine overall program requirements and constraints to consider, trainee population requirements, type of program, lead time, funding level, and general methods of initial training and sustaining practice.

2. Identify delivery system family and member candidates to meet the overall program requirements.

3. Identify requirements from subject matter characteristics to include skill level, training setting, and the type and training level requirements of individual-collective tasks.

4. Determine mix of delivery system requirements to meet the overall training program requirements; select/adapt delivery systems or specify a new delivery system requirement.

5. Prepare rationale to substantiate delivery system mix requirements for overall training program.

Block II - Allocate Delivery Systems to Performance Modules/Lessons

6. Determine delivery system requirements for each module/lesson.

7. Assign optimal delivery system mix to each module/lesson from Block I selections.

8. Prepare substantiating rationale for each module/lesson delivery system requirement.

The delivery system data base is used at steps 2, 4, and 7.

The result is a selection procedure, compatible with the USAFAS FY 78-83 frame of reference.[1] While permitting general application, the procedure allows the input of specific field artillery (FA) training requirements data. This is facilitated by inclusion of specific FA delivery system members within the Data Base. The application of the procedure results in clear statements of the substantiating rationale for delivery system requirements and selection.

[1] TR 78-A-3, "Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY 78-83 Period," ARI, February 1978.

DELIVERY SYSTEMS DATA BASE COMPONENT (ANNEX B) (ARI P -78-4)

The Delivery Systems Data Base, two-fold in purpose, is designed to be used in conjunction with the Procedure Guide to select the appropriate delivery system mix for a given program; it can also be used independently as an information source on characteristics of delivery systems. The data base is designed to be an evolving component. It currently contains information on a wide range of delivery systems now available to USAFAS and/or FA units or projected to be available from DA sources in the FY 78-83 time period. The data base is organized into "Families" with each Family containing one or more "Member" delivery systems. The Family is described briefly, both generically and then more specifically with abstracts of each Member.

Accompanying the 2-3 page Family description is a Member Characteristics table which summarizes general information about each Member that is contained in the Family file. Each applicable Member within the Family is then presented and described in a standard 9-page file format. Each Data Item in the file carries a "Comment" line to further specify or qualify, as needed, the meaning of those data items checked. The structure of the Member file is as shown in Table 1; its general layout is presented in Figure 5. An exemplary Member file (Remote Access PLANIT) is presented in its entirety as Appendix B.[1]

At present, the data base contains 42 member delivery systems in 12 families as listed in Table 2. This selection is geared towards USAFAS needs, especially in the following Families:

H. Computer Assisted/Managed Instruction (CAI/CMI)

I. Embedded Training

J. Training Devices/Simulators

All that is needed to expand the data base for Army-wide use is to amplify it with specific delivery systems employed by other service branches. The process of updating or modification is a simple one. New Members can be easily added to the Families; as can Families to the file.

[1] With this member file, the data entry content may be seen as well as its format. Within the Data Base itself, there is a section which defines all data categories and items as standardized for each member file.

Table 1

STRUCTURE OF MEMBER FILE

	Index Code	Descriptors
Families	(L)etter	A-Z
Members	(N)umber	1-n within family
Selection Factors	L.N.1	SOURCE/PROPONENT
	L.N.2	DESCRIPTION
	L.N.3	TRAINING & EVALUATION APPLICATIONS
	L.N.4	⋮
Delivery System Attributes	L.N.3	TRAINING & EVALUATION APPLICATIONS
	L.N.3.1	LEVEL OF TRAINING
	L.N.3.2	LEVEL OF EVALUATION
(Sequential, within Factors)	L.N.4	CAPABILITIES
	L.N.4.1	PRESENTATION
	L.N.4.2	RESPONSE
		⋮
Data Items	L.N.4.1	PRESENTATION
		a. Visual
(Sequential, within Attributes)		- Textual
		⋮
		- Motion
		- Color
		Etc.

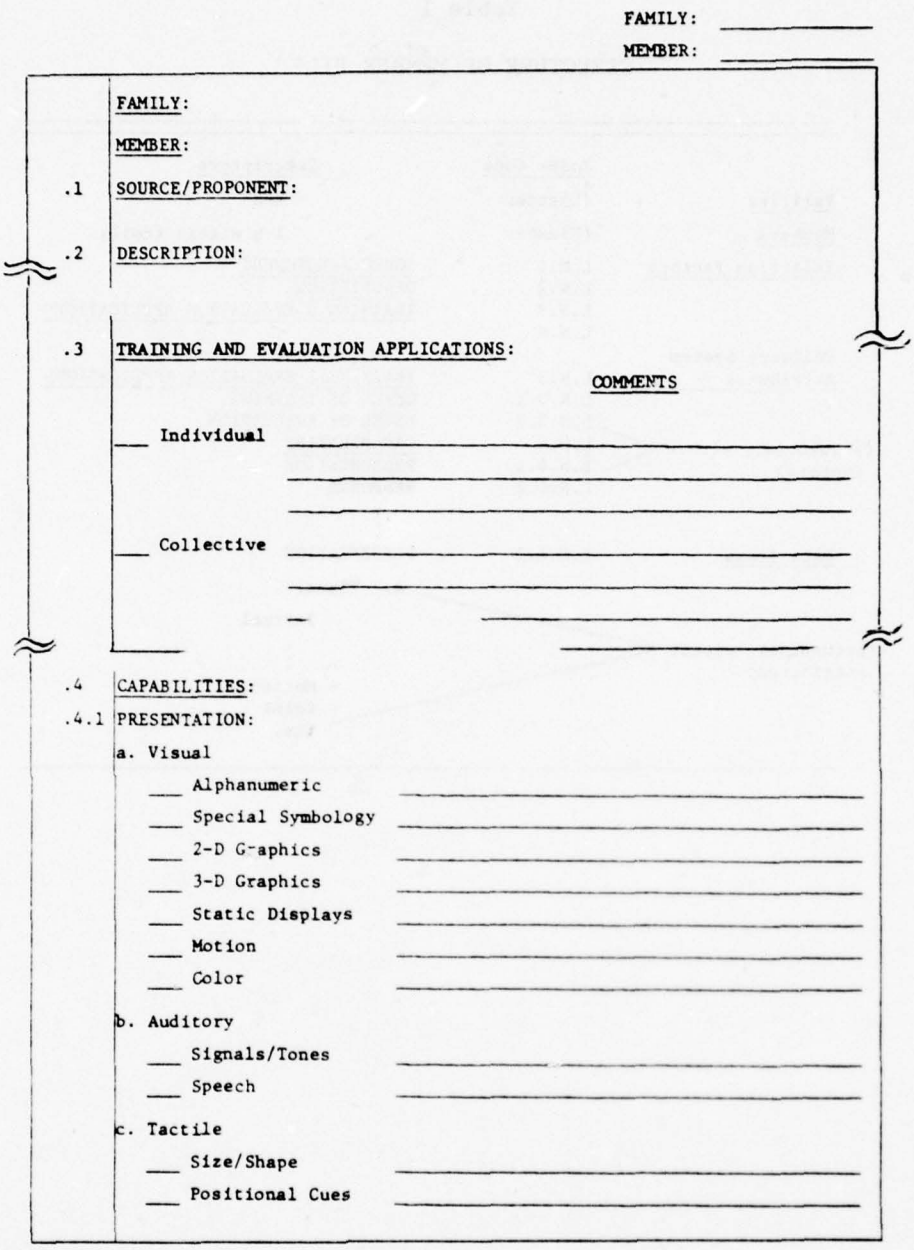


Figure 5. Sample member file format

Table 2

DELIVERY SYSTEMS DATA BASE FAMILIES AND MEMBERS

Family	Members
A. Job Materials	
	1. Field Manuals (FMs)
	2. Technical Manuals (TMs)
	3. ITDT Technical Manuals
B. Printed Materials	
	1. TEC Print
	2. Correspondence Courses
C. Training/Combat Literature	
	1. Soldier's Manual/Job Book
	2. Skill Qualification Tests (SQT)
	3. Army Training and Evaluation Program (ARTEP)
D. Instructor with Standard Aids	
	1. Class Packets
	2. Charts/Display Boards
	3. Overhead/Transparencies
	4. Models/Mockups
E. Audio-Only	
	1. TEC Audio-Only
	2. Language Labs (GEL)
F. Audio Visual	
	1. TEC Audio/Visual (BESELER CUE/SEE)
	2. Slides/Sound Slides
	3. Army Training Films
G. Television/Video Recording	
	1. Classroom Closed-Circuit Television (CCTV)
	2. Television Trainer (TVT)
	3. Video Disc
H. Computer Assisted/Managed Instruction (CAI/CMI)	
	1. Remote-Access PLANIT
	2. PLATO IV/TUTOR
	3. ABACUS Computerized Training System (CTS)
I. Embedded Training (ET)	
	1. Operational TACFIRE PLANIT
	2. TACFIRE Training System (TTS)
	3. TACFIRE Subsystem Team Training (TSTT)
J. Training Devices/Simulators	
	1. Sand Table
	2. Fire Control Simulator BT-33
	3. Observed Fire Trainer (OFT)
	4. Artillery Direct Fire Trainer (ADFT)
	5. M-31 Field Artillery Trainer
K. Tactical Engagement Simulations (TES)	
	1. SCOPES
	2. REALTRAIN (Exercise for Combined Arms Elements)
	3. MILES
L. Command/Staff Battle Simulations	
	1. Tactical Exercise Without Troups (TEWTS)
	2. CPX Simulation Facility
	3. Computer Assisted Map Maneuver System (CAMMS)
	4. Combined Arms Tactical Training Simulator (CATTS)
	5. FIRE FIGHT
	6. DUNN KEMPF
	7. PEGASUS
	8. First Battle

MOS 13F/FIST SAMPLE APPLICATION COMPONENT (ANNEX C)(ARI P-78-5)

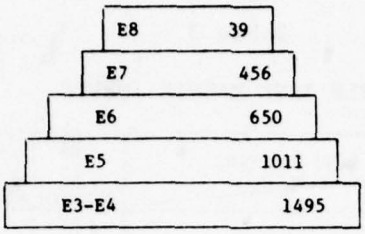
This third component of the user products illustrates the application of Procedure Guide and the Data Base to a particular USAFAS training support requirement--the cross-training of soldiers in MOS 11C/13E (or 11B/13B) for proficiency in Fire Support Specialist (MOS 13F) individual and team skills required by duty positions on the Fire Support Team (FIST) at maneuver company level. It serves as a walk-through example of how input data, the procedure guide, and the data base can be usefully applied. To accomplish this, it shows examples of inputs to each procedural step, provides a synopsis of the procedure and user decisions, and shows completed working products that are outcomes of the procedure.

Limited available data combined with the intention to make the example as close to reality as possible resulted in the selection of the FIST of a Tank Company as a representative sample. Considering the impact of new equipment, vehicles and munitions which will be made available in the FY 78-83 period, it seemed reasonable to limit the selected sample to a "Quick-Fix" solution, i.e., a solution implementing only those resources (personnel and equipment) presently available at the maneuver company. Based upon the data made available by USAFAS, tasks requiring training were identified, classified by task type and skill level, and grouped by duty position. Figure 6 is an example of the sample input trainee requirements data and Table 3 illustrates the task matrix groupings.

This FIST sample was then subjected to the Block I procedure. Activities and their results were described for each step and substep. Checklists, worksheets, summary sheets, and matrices provided in Block I of the Procedure Guide were appropriately used (filled-in) and included to document and illustrate the sample application. Figure 7 shows how tasks were analyzed and grouped by task type and training level requirements as required by the procedure, leading in subsequent steps to the determination of delivery system/training device requirements for the groupings. Figure 8 shows a portion of the rationale substantiating a particular delivery system mix, the outcome of Block I steps.

The sample inputs to Block II of the procedure (behavioral objectives, lesson design approaches and module/lesson strings) were simulated, since no learning analysis was available from USAFAS for the selected sample. Two performance modules were developed for illustrative purposes:

- Module A - Operate and Maintain an M113A1
- Module B - Request and Adjust Fire While Moving to Different Locations in an M113A1



FIST
Army-Wide Requirements

FIST Company Requirements

POSITION	RANK	TANK CO	MECH INF. CO	INF. CO	AIRB. INF. CO	AIRMOB. INF. CO	NO. OF POSITIONS
FIST CHIEF	LT(FA)	1	1	1	1	1	456
SR. FS. SGT	SSG	1	1	1	1	1	456
ASST. FS. SGT	SGT	1	1	1	1	1	456
PLATOON FO	SGT	-	3	3	3	3	1011
ASST. PL.FO/RTO	PFC	-	3	3	-	-	1381
PER. CARR. DVR	SP4	1	1	-	-	-	
MI5IA2 DVR/RTO	PFC	-	-	1	-	-	
RTO	PFC	1	-	-	1	1	
FIST		5	10	10	7	7	3760

FIST Tank Company Requirements

DUTY POSIT.	SKILL LEVEL/ RANK	JOB LOCAT.	TRAINEE DENSITY		JOB RELATED EXPERIENCE
FIST CHIEF	LT.	UNIT	1	PER COMPANY	FA FO
SR. FS. SGT	4/SSG		1		FA FO PARTY
ASST. FS. SGT	3/SGT		1		MORTAR FO
APC DVR	1/SP4		1		MORTAR FO PARTY
RTO	1/PFC		1		FA FO PARTY

Total Trainees: 5 X 138 = 690

Figure 6. Trainee input requirements used in FIST sample

Table 3

SAMPLE TASK MATRIX INPUTS

TASK \ DUTY POSITION	DVR	RTO	ASST FS SGT	SR FS SGT	FIST CHIEF	
OP. M113A1 UNDER USUAL CONDITIONS	X	X	X	X	X	
OP. M113AL UNDER UNUSUAL CONDITIONS	X	X	X	X	X	
PERFORM BEFORE/DURING/AFTER OP. CHECKS & SERV.	X	X	X	X		
PERFORM ESC EVALUATION OF AN M113A1	X	X	X	X		
PERPARE AN M113A1 FOR OPS UNDER UNUSUAL CONDITIONS			X	X	X	
TRAIN PERS. TO OPERATE M113A1			X	X	X	
INSPECT OP. MAINT. USING PMI				X	X	
PREPARE FOR OPS AND OPERATE AN/VRC-46		X	X			
INSTALL AND OPERATE AN/GRA-39		X	X			
PREPARE FOR OPS AND OPERATE KY-38		X	X			
PERFORM OPS CHECKS AND SERVICES ON AN/VRC-46		X	X			
PERFORM OPS CHECKS AND SERVICES ON AN/GRA-39		X	X			
PREPARE FOR OPS AND OPERATE AN/VIC 1		X	X			
PERFORM OPS CHECKS AND SERVICES ON AN/VIC 1		X	X			INDIVIDUAL
GUIDE TRACKED VEHICLE	X	X	X	X	X	TEAM
ERECT/DISMANTLE ANTENNA RC-292		X	X			

Subject Matter Characteristics Worksheet

TASK STATEMENT	SKILL LEVEL	TRG. SETTING				OTHER REQ.	TASK TYPE				TRG. LEVEL	ELEMENTS INTERACTING
		INIT.		PROF			IND		TEAM			
		I	U	I	U		E	S	E	S		
PERFORM OP. CHECKS & SERVICES	1		X		X		X				4	
PERFORM ESC EVALUATION	1		X		X		X				4	
PREPARE M113A1 FOR OPS (UNUSUAL CONDITIONS)	3		X		X		X				4	
TRAIN PERS. TO OP. M113A1	3		X		X		X				4	
INSPECT OP. MAINT. USING PMI	4		X		X		X				4	
GUIDE TRACKED VEHICLE	1		X		X				X		5	DRIVER, GUIDING PERSON
PREPARE FOR OPS & OP AN/VRC-46	1		X		X		X				4	
INSTALL AND OP AN/GRA-39	1		X		X		X				4	
CONDUCT ADJ. FIRE MISSION	1		X		X	L M TRG. AREA				X	7	FIST, SUPPORTING ELEMENT(s), SUPPORTED ELEMENT
CONDUCT FFE MISSION	1		X		X					X	7	
CONDUCT ILLUM. MISSION	1		X		X					X	7	
CONDUCT IMM. SMOKE MISSION	1		X		X					X	7	

Task Type/Training Level Worksheet

TRG. LEVEL / TASK TYPE	1-2	3	4	5-7
	INDIV.	INDIV.	INDIV.	TEAM
EQUIPMENT ORIENTED			12	2
SITUATION ORIENTED	4	3	11	11

23 13 = 36

Figure 7. Summary of task type and training level requirements having unique delivery system requirements

1. Program Requirements and Constraints: The 13F/FIST Quick-Fix trainee pool consists of soldiers with related entry-level skills. They are used to operating communications equipment and vehicles. They are familiar with the job of indirect fire observers in at least one mode (13E/11C or 13B/11B).

   The given short lead-time makes maximum use of existing materials mandatory where appropriate. There is a trade-off possibility between adjusting and utilizing existing materials versus developing new materials for the selected delivery systems.

   Methods of instruction required include team training and supervised on-the-job training. Trainee response must be actual performance.

2. Requirements of Subject Matter: The main thrust of the mission and job-duty task training requirements are in the following areas:

   a. FIST Operations Concept. Requires individual situation-oriented training in unit specific organization, mission, job duties, Regs, SOPs (Training Level 1).

3. Delivery System Requirements: The training program (sample FIST of a Tank Co, Quick-Fix) will require a delivery systems mix as follows:

   a. Job materials (FMs) and Training/Combat Literature for the FIST Operations Concept.

   b. Highly pictorial, proceduralized job materials (TMs) and continuing hands-on practice including REALTRAIN missions for proficiency on newly assigned Unit Equipment.

   c. Training/Combat Literature, Training Devices/Simulators (Sand Table, OFT, M-31) and Tactical Engagement Simulations (REALTRAIN) for FIST Duty/Mission tactical practice.

   d. As an alternative, audiovisual presentations (e.g., TEC audiovisual, TEC audio-only, or TVT) may be considered to augment the use of training devices/simulators.

4. Requirements of Trainees: The delivery system mix selected is appropriate for the expected trainees, enlisted personnel Skill Levels 1-4

5. Training Effectiveness of Delivery Systems Mix: The employment of existing resources (manuals and training/combat literature, adapted or supplement as required) and existing, exportable training devices/simulators combined with carefully planned participation in REALTRAIN (and MILES, when available) will provide a credible unit-level training program, ensuring an increase in effectiveness of cross-trained soldiers at substantial savings.

   Evaluations of the exportable training devices/simulators by USAFAS and of REALTRAIN by ARI/TRADOC in USAREUR has shown these methods to be highly effective in job-transfer of training and mission effectiveness. Soldiers also find these methods highly credible and acceptable. There is considerable potential for more efficient use of ammo, fuel, and time available for realistic tactical training while units are in Garrison, Local, or Major training areas.

Figure 8. Portion of rationale for overall training program delivery systems mix

DEVELOPMENT OF ARMY-WIDE METHODOLOGY

PURPOSE

Practical methods consisting of procedures and supportive aids for application by Army developers can best be developed and modified through continual correction of shortfalls in selected methods, procedures, and aids as they are applied by users to a real developmental requirement. This parallel approach of application and revision to procedures provides an obvious self-correcting feature to methodology development. This, however, was not fully possible within the current scope of work. Revision and integration of the procedure guide and data base products was accomplished to the extent possible by findings during application to a sample set of MOS 13F/FIST training requirements. Therefore, this section briefly elaborates on the methodology and product goals, technical issues surfaced and resolved during product development, and possible shortfalls which may exist in the methodology or products pending tryout applications by Army users.

GOALS AND CRITERIA

Several goals guided the development of the delivery system methodology, procedures, and associated user aids. Some of these were expressed in the FY 78-83 TEC Media report[1] from the prior contract phase and carried forward for incorporation within the current work effort. Others were generated during initial planning meetings with ARI and USAFAS regarding the current product-oriented work.[2] These goals were also intended as interim criteria for evaluation of the product components, pending future tryout applications of the products by USAFAS and other Army training developers.

1. Useful to USAFAS. Based upon work with USAFAS course developers and interviews with training development and course design/development supervisors in the prior contract period, it was possible to determine their priorities and related experience with regard to the methodology products. The assumed users are military (Senior NCO through Majors) and civilian (GS6-GS13) training developers, course designers, and supervisors who must operationalize Instructional System Development (ISD) guidelines (TRADOC Pam 350-30) and program-specific directives to develop training products in support of field force training requirements. As part of determining training requirements, they must also specify delivery system (method/media) requirements and determine a mix of Army resources to best fit these requirements.

[1] ARI TR-78-A3 (Section 4A).

[2] "Memorandum of Understanding on TEC Media Task 8 Product Goals," Attachment 1 to SDC Letter of 11 August 1977 from F. D. Bennik to Major John A. Evans (DCRDT, USAFAS) and Dr. Leon Nawrocki (ARI).

The procedure guide for delivery system selection and the delivery system data base were designed to be used specifically by USAFAS training developers, course developers, and other appropriate personnel in the above target group. In addition, these products also have a potential Army-wide application by other TRADOC field force proponents and can be used wherever Army training programs are developed and method/media selections must be made.

The individual steps of the procedure while operable by USAFAS personnel have not been directly tied to specific USAFAS directives, procedures, or SOPs. They are compatible with but different from the ISD Block 3.2 process. The procedural steps are in fact independent of any specific Army setting, the only restriction being that they are applicable to a method/media selection process for a training effort. The 13F/FIST application example illustrates that the procedure can be useful to a particular USAFAS training requirement.

2. Consider Trainee Characteristics. The procedure and data base structure allows for varying trainee considerations. One of the initial considerations in the procedure is to review the trainee requirements that have been derived as a result of a front end analysis effort. The impact of trainee population characteristics upon the selection of delivery systems is taken into account by the procedure. The Procedure Guide directs the user to consider the following factors concerning trainee characteristics; job and duty positions required, skill levels needed, job location and training density requirements, job related experience and specific trainee aptitudes and abilities in areas such as reading, verbal and manual dexterity. Each Data Base member file also considers trainee characteristics as they may influence specific delivery systems.

3. Considers Training Setting. There is a strong interaction between training setting (I-G-L-M) and delivery system requirements. The impact of where initial as well as sustaining training is to occur; institutional, unit or a combination is considered within the Procedure Guide and Data Base. There are basic differences and approaches taken in the development and administration of training depending upon the training setting. An institutional setting may be used because it can (1) offer unique facilities and specialized non-exportable delivery systems or personnel skills not found in a unit setting, or (2) special facilities for complex, new equipment training of initial operational cadres (e.g., TACFIRE transition training). To receive institutional training the trainee must physically leave his job setting and be in place at the institution. In contrast, unit training keeps the trainee in the job setting but cannot

accommodate large numbers of personnel being simultaneously in a training status because of mission requirements. The Procedure Guide and Data Base make provisions for the training setting and differentiate delivery systems as to their setting applications, e.g., embedded in materiel system, ILC, barracks, Local/Major training area, etc.[1]

4. Considers Subject Matter Characteristics. The products consider the impact of the type of task to be trained and the levels of task training requirements. Depending on whether tasks are individual or team (collective) tasks, different considerations must be given to the selection of delivery systems. Delivery systems that support individual tasks may not be appropriate for team tasks. Nor may delivery systems that support team tasks function appropriately in support of individual tasks. The Procedure Guide requires that tasks be clustered as to whether they are individual-equipment, individual-situational, team-equipment or team-situational. The application of the delivery systems within the Data Base are specified accordingly as to whether they are used for individual, team, or both types of tasks.

   The training level at which tasks are performed was also considered. Eight levels were defined ranging from job/unit levels to multiple unit interaction through command/staff interactions. The Procedure Guide directs the users to determine the training level for each task and the Data Base indicates at what level(s) the specific delivery system can be applied. The MOS 13F/FIST Sample Application shows how the tasks are clustered by type and level to determine the primary delivery system requirements. Thus, there is a correspondence between the Procedure Guide and the Data Base.

5. Considers Training Resources Usable in Units and Institutions. The products take into consideration training resources that currently exist or are potentially available in the near future (FY 78-83). Of primary concern within the Procedure Guide and Data Base is to specify requirements and decide among delivery systems that can be used within institutional settings or are capable of export to the unit level. Delivery systems ranging from printed materials (e.g., TMs, FMs, ITDT Manuals) to training devices and simulators (e.g., Fire Control Simulator BT-33, M-31 Field Artillery Trainer) through Tactical Engagement Simulations (e.g., SCOPES, REALTRAIN) and Command/Staff Battle Simulations (e.g., CATTS, DUNN-KEMPF) are included within the Data Base and may be selected to meet training requirements.

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[1] These setting attributes build upon and are in accord with TC 21-5-7 and TRADOC Reg 350-100-1 (April 1977, Draft).

Whenever training requirements cannot be met by selection or adaptation of those delivery systems cataloged within the Data Base, the Procedure Guide indicates that a new delivery system must be specified. The required characteristics are determined and recorded as part of the procedure. The Delivery Systems Data Base data categories and item descriptions can be used as a specification guide for new requirements.

ISSUES SURFACED AND THEIR RESOLUTION

Application of the Procedure Guide and Data Base to the sample MOS 13F Quick-Fix training requirements for the FIST of a Tank Company served to clarify and resolve technical and user-related issues in such areas as the following:

1. Implications of five major types of training support requirements on delivery system requirements, constraints, and applicable documentation. The six program types and implications now considered by the Procedure Guide are: (1) Integrated Technical Documentation and Training (ITDT), (2) new system development, (3) retrofit to fielded systems, (4) school-based job training programs, (5) unit exportable job training with sustaining mission practice, and (6) major training program updates.

2. Identification of primary and secondary delivery system requirements and constraints, and decisions on ordering of associated procedural steps. The primary interacting factors considered in establishing delivery system requirements were trainee requirements or "who", individual-collective subject matter requirements or "what", training settings or "where", and delivery system characteristics or "how", including the exportability and mobility of various delivery systems. A number of realistic constraints were also considered; e.g., Army-wide and program-specific directives for the type of training program, lead-time from delivery system decisions to initial training usage, funding levels for acquisition, O&M, and courseware support, etc. A number of revisions to the procedure were made to incorporate a realistic ordering of the various factors as they enter into delivery system decisions for the overall program based on data from front-end analysis and earlier phases, as well as design phase decisions on delivery systems appropriate to specific modules of lessons.

3. Trainee characteristics data applicable to delivery system requirements. Both the types of data and available data sources in this area were a subject of initial discussions with ARI and USAFAS, and again during the developmental work. The procedure now utilizes

primarily two types of readily available personnel subsystem data as input: (1) number of trainees and training density requirements; (2) entry level related experience and skills. In addition to these primary decision factors, the procedure can also utilize target population profile data with respect to general mental abilities (GT), physical strength or manual dexterity, and specific aptitudes (e.g., reading, vocabulary, and comprehension or mechanical). Use of such data assumes availability and that comparable requirements the delivery system places on trainees in these areas can be gauged and entered under appropriate items in the Delivery Systems Data Base.

It is also true that optimal utilization of any delivery system media by course developers may enhance or detract the training effectiveness of that delivery system with respect to the target trainee population. This is the subject of course development through individual trials, small/large-group validation, and preliminary implementation with soldiers truly representative of the target population. The procedure does not address these issues of media development. Similarly, the assignment of alternative delivery systems for an equivalent training objective depending on trainee characteristics, if feasible, becomes a part of the training management implementation plan and is not addressed by the current Procedure Guide.

4. Integration of Procedure and Data Base. Considerable work was expended to ensure compatibility of checklists and worksheets in the Procedure Guide with data categories and items in the data base. In general, the standard nine-page data file description used for each delivery system in the data base contains more detailed data than required by the Procedure Guide. For this reason the Delivery System member file format may also be useful to describe developmental requirements for a new delivery system, including training devices, where a developmental prototype does not yet exist.

   Another area of integration was trade-offs on the number of times a user must compare delivery system requirements specified by using the Procedure Guide against delivery system characteristics contained in the Data Base, considering the types and amounts of data to be compared in each pass at the data base. This consideration resulted in a number of refinements to user checklists and worksheets of the Procedure Guide, as well as some tabular aids to summarize certain items in the data base. The option of putting all Data Base characteristics into summary tabular or matrix form was avoided, since large data matrices pose update problems and would in essence negate the function of the Data Base document.

POTENTIAL SHORTFALLS

Few shortfalls in the delivery system methodology, procedures, and associated user aids are readily apparent at this time, since the three product documents were focused on fulfilling the aforementioned set of design goals and were modified several times to be mutually supportive. Application of the procedure to sample MOS 13F/FIST "Quick Fix" individual-collective tasks and training requirements data served to clarify and resolve both technical and user-related issues such as those discussed above.

In developing the products, however, the limited project scope left several goals not fully realized and certain questions remain unanswered.

- Use of the product components as yet has not been verified by the intended military users carrying out a trial application. Until this occurs only subjective estimates can be made that the procedure is workable and potentially useful to USAFAS and other users to make delivery system decisions for a variety of program requirements. However, the sample application to MOS 13F training requirements used during the development of the procedure which is currently intended to serve as a working example adds considerable credibility that the procedure is workable within a military environment. This need for tryout application by the intended military users was an original step in the proposed TEC Media workplan[1] and is again emphasized under "Recommendations" in this document.

- In developing the Delivery Systems Data Base, an oversite in data collection occurred in that specific information concerning the training effectiveness of each delivery system was not solicited. Information of this nature is therefore not directly entered into the data base but must be inferred by the information contained in the data file, such as the application of the delivery system for individual-collective equipment or situational tasks, setting requirements, and the general presentation, response, feedback and management control inherent within the delivery system.[2] Because of this data collection oversight, a new question on "Training Effectiveness" has been added to the end of the Delivery System Data Questionnaire, Appendix A, item 16.

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[1] Bennik, F. D., et al. Determining TEC Media Alternatives for Field Artillery Individual-Collective Training in the FY 78-83 Period, (Appendix D), ARI TR-78-A3, February 1978.

[2] Delivery system file items L.N.3 (Training and Evaluation Applications), L.N.3.1 (Levels of Training Requirements), L.N.4 (Capabilities) and L.N.5.3 (Setting Requirements) in Appendix B.

- Cost data was another difficult item to obtain for each delivery system. The difficulty arose for two primary reasons. One reason was the inability of the data collection questionnaire to clearly define the categories of cost data that was desired. This apparently led some of the recipients of the questionnaire to omit this information or to oversimplify the information that was entered. Another reason was that the information was simply not available to the recipients or to the SDC team on several of the delivery systems. In some cases, when this occurred, the recipient suggested a secondary source where the cost data might be obtained. Unfortunately, time did not permit a thorough followup of the secondary sources that were indicated. Wherever possible, project personnel estimated the relative magnitude of costs, and entries in the data base were checked as appropriate. The results are that the cost data as reflected in the data base is in many cases "best" estimates of relative magnitudes based on project team experience. Where this was not possible, cost data remains incomplete.

CONCLUSIONS AND RECOMMENDATIONS

SDC concludes that a procedure for determining delivery system requirements is both workable for USAFAS developers and generalizable to Army-wide training and delivery system requirements determination in the FY 78-83 period. Several follow-up recommendations are suggested.

CONCLUSIONS

1. *A two-stage procedure with supportive user aids has been developed to enable specifying delivery system requirements; first to determine the delivery systems mix to meet overall training program requirements and constraints, and then to specify the requirements unique to each module/lesson within the training program.*

   A procedure consisting of several steps and substeps has been organized into two distinct blocks of activity in which training developers, course developers, and other appropriate personnel are guided in determining a delivery system mix to meet the overall program requirements. From these initial delivery system requirements, the procedure proceeds to the specification of a method/media mix for specific module/lessons. The first block is designed to utilize outputs of the front end analysis and takes into consideration overall requirements and constraints that may impact upon the delivery system selection. The second block is designed to utilize outputs of the design phase preceding materials development.

2. *A delivery systems data base has been developed which supports the delivery system requirements and selection procedure and, independently, can function as a stand-alone reference tool. It contains standard data on a wide range of Army delivery systems available or potentially so within the next five years.*

   Information concerning Army delivery systems which are currently and potentially available to USAFAS and FA units during the FY 78-83 time period has been collected from various Army sources and been organized into a data base currently in catalog look-up format. Twelve generic Families have been formalized and 42 delivery system Members have been assembled under the appropriate Family. The data base is designed to support the procedure at several decision points and is organized to correspond to procedure needs and requirements. It is designed for ease of look-up at the Family or Member levels. The data base is also organized so that it can be readily expanded to include additional Member delivery systems within Families if the need arises. Included with each Family description is an overview member characteristics table which summarizes the following delivery system attributes: presentation, training method, training level, setting, acquisition and courseware costs, and time frame of availability.

3. *Guidance for preparing a rationale justifying a particular mix of delivery system requirements has been incorporated within the procedure and illustrated in the MOS 13F/FIST sample application.*

   The rationale as to why delivery systems (method/media) have been selected at each major Block in the procedure has been incorporated within the procedure. A suggested format and items that need to be considered in preparing a rationale to support the required delivery system mix is provided to guide the user. Sample rationale statements have been prepared as part of the application example.

4. *An application example has been prepared which demonstrates that the procedure is workable with a realistic and representative set of training requirements.*

   Data from the Fire Support Team (FIST) MOS 13F has been prepared and utilized to first, submit the procedure to a shakedown during the development process and second, to illustrate that the procedure is workable for a trial application. Sample products representative of trainee, setting, task, and constraints data from a front end analysis were generated and then submitted to each step within Block I of the procedure to determine delivery system requirements and a selection of mix for the total program requirements. These results were in turn submitted to Block II steps to further specify the delivery system mix for each of two sample Fire Support Team module design approaches that was generated.

5. *The standard data base delivery system member file format and worksheets used in the procedure are just as useful for specifying a developmental requirement for a new delivery system/training device as for selecting among delivery systems anticipated available during FY 78-83.*

   The requirements worksheets are used in the procedure to specify requirements of several types, before comparison with data categories describing existing or potentially available delivery systems in the data base. Similarly, the standard descriptive file format of factors, attributes, data items, and item comments in the data base can either describe a known delivery system or serve as a specification of a requirement for adaptation or new development.

RECOMMENDATIONS

This project has resulted in the development of several products; a procedure for determining delivery systems requirements, a delivery systems data base that supports the procedure or can be used independently as a reference, and a sample application of both using data from the Fire Support Team (FIST) MOS 13F. The following recommendations are provided for consideration by ARI and USAFAS:

1. Subject the procedure to an in-school tryout by military users. The procedure has not yet been subjected to verification by military users. Thus far, a sample application using data from the Fire Support Team (FIST) MOS 13F has been used by the project team to integrate and verify logical consistency of the procedure steps and demonstrate that the procedure appears to be workable. However, data for the sample application in some instances had to be inferred as credibly as possible from the data made available and could not, within the scope of work, contain all tasks required of the Fire Support Team. Therefore, it is recommended that the procedure be subjected to a trial application by military users using actual and more comprehensive data for a program requirement. In this manner, the usefulness of the procedure to training and course designers can be verified and any fine tuning of the procedure can be accomplished.

2. Refine packaging of some of the procedural user aids. For example, it is somewhat cumbersome in Block I, Step 4, to compare the Delivery Systems General Requirements Summary Worksheet with the Delivery Systems General Requirements Matrix. The same can be said for Block II, Step 7 when the user compares the Module/Lesson Requirements worksheet against the Delivery System Characteristics Table for those delivery systems that were selected as a result of Block I in the procedure. In this case, it is recommended that the Module/Lesson Requirements worksheets be prepared on separate sheets or mylar overlays. This will permit the user to easily slide the single sheet (or mylar overlay) down the Delivery Systems Characteristics Table for comparison of the requirements of the module/lesson against the selected delivery system characteristics to determine a "best fit" match.

3. Expand the data base to include additional delivery systems. The delivery systems data base currently contains 42 member delivery systems organized into 12 generic Families. The Families/Members included primarily reflect those Army delivery systems that are currently available or projected to be available to USAFAS and/or FA units during the FY 78-83 period. In fact, some of these delivery systems are or will be available Army-wide (e.g., TEC audiovisual, TVT, REALTRAIN, MILES) while others are specific to Field Artillery application (e.g., several of the training device simulators). By in-progress agreement with ARI, several categories of delivery systems

are presently excluded (e.g., MAGLADS program devices, micrographics, and satellite distribution systems). In addition, many more training devices/simulators specific to Army weapons systems or Families of such devices are missing. To make the data base more complete with greater potential for Army-wide applications, it is recommended that the data base be reviewed and consideration given to the incorporation of additional Families/Members that are currently available within the Army as well as those under development or planned for the future. It is also possible that a variety of specific items could be cataloged within member files (e.g., specific Army actual objects, specific TEC lessons, specific correspondence courses). This would be better done if Recommendation 4 were implemented.

4. Make the Delivery Systems Data Base accessible to computer-based update and data retrieval. The Delivery Systems Data Base, currently in printed look-up form, has a file format design such that it could be entered into a computer system using a currently available text editor software system. This would permit additions, corrections, and modifications to be easily made on-line. Access to the data base could be accomplished by various Army agencies using remote telecommunications tied to a terminal device. Other software is available should a more sophisticated user query language based on data file criteria be desired for flexible information retrieval. The desirability of these suggestions will depend upon the volume of added Member files, cataloging of specific courseware within Members, and additions or corrections to data items anticipated by Army user groups.

5. Consider the possibility of entering all or parts of the procedure to an interactive computer-based system for use as an "author-aid" by those personnel interested in delivery system requirements. The procedure could be constructed as a series of computer-assisted lessons or instructional prompts that would lead the user through the steps and decisions of the procedure with a software user language such as PLANIT or PLATO IV[1] TUTOR. Responses to the procedure decisions or activities required could either be entered on-line using a terminal device for further analysis by the program or on off-line forms. This activity should probably not be considered or undertaken until after a shakedown by the proponent school has occurred using the procedure and data base in paper form. (See Number 1 above.) This would permit requirements for revisions or modifications to the procedure steps/decisions, guidelines, checklists, and data base to surface as a result of one application revision cycle before any on-computer incorporation of the procedure is mounted.

[1]PLATO is a registered trademark of Control Data Corporation. The PLATO system is used by the Department of Army as a research vehicle.

6. Consider the possibility of expanding the procedure to include aspects of delivery systems utilization subsequent to the program design phase. The procedure's current focus is upon that period within the training program development cycle from delivery system decisions made during the front end analysis leading to a mix for the entire program, to completion of the program design phase leading to choice of specific delivery systems for modules and lessons. Guidelines on how to best utilize any given selected media during development of courseware are not provided. Neither are considerations for assigning alternative available delivery systems during training implementation in accordance with supervisory training management plans addressed (e.g., assignment of alternative training resources to trainees based upon trainee characteristics or other criteria). The procedure could be expanded to include the necessary steps and decisions that need to be considered for such assignments to occur and the rationale for the results.

7. The possibility exists to determine the Army-wide applicability of the procedure and data base, including shortfalls, through application to various Army programs. Every attempt has been made within the limited scope of this work to make the procedure and data file useful to Army-wide school field force proponency support requirements. Application to various system-oriented requirements (e.g., IFV) and maintenance or administrative programs may reveal new requirements.

APPENDIX A

DELIVERY SYSTEM DATA QUESTIONNAIRE

This Appendix contains the Delivery System Data Questionnaire that was used as the primary data gathering source for information concerning delivery systems that were incorporated into the Delivery Systems Data Base.

NOTE: Item 16 on Training Effectiveness was not used in this project. To correct this recognized shortfall, it should be added for future data collection on all delivery systems, including training devices/simulators.

S A M P L E

DELIVERY SYSTEM DATA QUESTIONNAIRE

Delivery System: _____

Proponent Group: _____

Current Information: _____

General Requirement: Need a brief description of the system as developed and the projected use of the system during the FY 78-83 time period. If documentation directly related to questions is available, please send relevant pages and cross-reference in answers below.

Specific Categories of Information:

1. Description: Briefly describe system configuration and components. Indicate the training or evaluation need addressed by the system and the functions of components.

2. Application: Indicate the type and level of training the system is designed to support. Consider individual, collective or both. Indicate to what extent the system realistically prepares the person to perform on the job. Consider capability for practical exercise leading to SQTs and for practice of individual/collective tasks leading to ARTEPs.

USE REVERSE SIDE IF MORE SPACE IS NEEDED

3. Presentation: Describe how the information is presented to the student. Consider static versus dynamic, color versus black/white, symbology used or any other attributes of the system.

4. Response: Describe whether the student is required to make a response and how the response is made (written, oral, keyed, pointing device, etc.). Describe if and how the response is evaluated (self-check, instructor/supervisor check, check of display readout, preprogrammed standards, etc.).

5. Feedback: Describe whether and how the system presents feedback to the student. Consider whether feedback is informative, evaluative, corrective, and whether it is immediate or delayed.

6. Control of Presentation: Describe how the sequencing and pacing of presentations is controlled. Describe options available (e.g., freeze, replay) and how are they used. Consider learner-controlled, media-controlled, and other methods.

USE REVERSE SIDE IF MORE SPACE IS NEEDED

7. Recordkeeping: Describe whether the system maintains a record of student performance. Indicate if a manual system is used apart from the delivery system.

8. Training Setting: Describe the intended training setting(s) for the delivery system and any major limitations. Consider USAFAS setting, unit, or other. Be as specific as possible (e.g., in-system, on job, classroom, garrison-local-major training area, learning center, etc.).

9. Exportability: Describe any plans for export to TRADOC groups or Active/Reserve units during FY 78-83. Be as specific as possible; e.g., Basis of Issue plan, date of initial operational capability, probable source of system components and courseware.

10. Logistic Support Requirements: Describe any logistical support requirements that are or may be needed to support the delivery system. Consider such items as need for spare parts, extra copies on hand, maintenance requirements.

USE REVERSE SIDE IF MORE SPACE IS NEEDED

11. Manning Requirements: Describe how many people are required or projected to be required to operate the system. Consider system operators, instructors, facilitators, and support personnel.

12. School Operational Support Requirements: Describe any special personnel skills and/or special equipment that the school must have to support the delivery system (e.g., for installation, user training, courseware development, evaluation).

13. Update Requirements: Describe the requirements (personnel and equipment) that may be needed to update the delivery system, including courseware, especially if these requirements differ from Item 12.

14. Relative Costs: For each of the following areas, indicate actual or projected per unit cost figures if known or consider the magnitude of the cost factors for each category. If our guideline figures are not realistic, refine the figures, as appropriate, and check magnitude.

a. System Acquisition (excluding training materials)

		Magnitude	Our Range	Your Figures
Cost per unit _____	OR	☐ High	>500K	_____
		☐ Med	200-<500K	_____
		☐ Low	<200K	_____

USE REVERSE SIDE IF MORE SPACE IS NEEDED

14. Relative Costs (Cont.)

b. Current or projected operational costs

Cost per instructional session		Magnitude	Our Range	Your Figures
_____		☐ High	>1,000	_____
of length _____ _____	OR	☐ Med	500-<1,000	_____
or other parameter (specify):		☐ Low	<500	_____
_____				

c. Maintenance costs

Cost per unit per day		Magnitude	Our Range	Your Figures
_____		☐ High	>100.00	_____
or other parameter (specify):	OR	☐ Med	50.00-<100	_____
_____ _____		☐ Low	<50.00	_____

d. Training Materials Development (consider lessons, scenarios, A/V, slides, videotapes, etc.)

Cost per lesson unit		Mangitude	Our Range	Your Figures
_____		☐ High	>20,000	_____
of length _____	OR	☐ Med	10,000- 20,000	_____
		☐ Low	<10,000	_____

	Magnitude	Our Range	Your Figures
OR Developmental Ratio (Development hours per training hour to validated product, excluding task analysis)	☐ High	>200:1	_____
	☐ Med	100:1-<200:1	_____
	☐ Low	>100:1	_____

15. Trainee Prerequisites: Are any special abilities assumed for trainees who are trained with this delivery system? Consider GT, aptitudes (verbal, mechanical, etc.), physical or manual dexterity, EPMS/OPMS skill level, MOS experience, prerequisite subjects, etc.

16. Training Effectiveness: Indicate the situations in which this delivery system has been shown to cause positive transfer of training when going from the delivery system in a training setting to an operational mission, job, or materiel system. Cite any available estimates or data on effectiveness, efficiency (reduced time, manpower, ammo, fuel, etc.), and acceptance by trainees or school/unit supervisors.

COMPLETED BY:_____ DATE: _____

ORGANIZATION: _____

PHONE (Commercial): _____

APPENDIX B

SAMPLE DATA BASE MEMBER DESCRIPTION

This Appendix contains a representative member, Remote-Access PLANIT, from the Delivery Systems Data Base.

FAMILY: H

MEMBER: 1

H — FAMILY: COMPUTER-ASSISTED/MANAGED INSTRUCTION (CAI/CMI)

1 — MEMBER: Remote-Access PLANIT

H.1.1 SOURCE/PROPONENT: Access to PLANIT System-Army Research Institute. Courseware development - Director, Directorate of Course Development and Training, USAFAS.

H.1.2 DESCRIPTION:

Remote-access PLANIT is an individual training system that presents instructional material via telecommunications to a trainee at a CRT or teletype terminal at a remote station. The CAI system PLANIT (Programming LANguage for Interactive Teaching) Version 3.1 operates on the UNIVAC 1108 computer at the Edgewood Arsenal facility. PLANIT is designed for maximum ease of transferability among computers of different vendors and operates at other Army locations. Each student station uses a remote terminal station with the number of stations being dependent upon the number of users accessing the UNIVAC 1108. Up to 30 student stations are possible in the time-sharing environment but operation times (response to presentation) tends to increase as user load increases. The trainee establishes communication with the UNIVAC 1108 computer by direct telephone link-up, logs onto the system, loads PLANIT, and requests the lesson of his choice. The instructional material is presented at the remote student station where the trainee proceeds through the material at his own pace. The trainee keys in his response using the terminal keyboard. PLANIT evaluates the response using a number of features that are provided within the system and determines the next instructional segment to be presented. Performance records are automatically maintained by PLANIT which can be processed by the instructor or facilitator. This is in addition to an interactive record which is printed on a line printer. The trainee can end an

(Continued on next page)

H.1.3 TRAINING AND EVALUATION APPLICATIONS:

		COMMENTS
X	Individual	Self-paced individualized instruction in any subject in which textual displays and keyboard responses, augmented by exhibits, is appropriate to the
___	Collective	training requirement.

FAMILY: H

MEMBER: 1

H.1.2 DESCRIPTION (Cont'd)

on-line session and then resume instruction at a later date and be automatically returned to the appropriate position in the instructional material. Lessons can be linked to form an instructional segment (module) with movement among lessons being invisible to the trainee. Lessons can be developed, executed and edited on-line by the author and then entered into a permanent lesson file by the system operator using the Text Editor system. Existing courseware can be immediately updated to reflect necessary changes through the use of PLANIT editing capabilities. On-line instructional material may be augmented by off-line exhibits. Plans for export are unknown, but the system is accessible with a remote terminal.

FAMILY: H

MEMBER: 1

H.1.3	TRAINING AND EVALUATION (CONT'D)	
H.1.3.1	LEVEL OF TRAINING:	COMMENTS
	X Unit Organization & Job Duties	Courseware can be developed to present individual instruction up through component training and procedures.
	X Tool Applications to Unit Job Duties	
	X Component Procedures	
	X Task/Situation Practice	Some tasks (e.g., computer programming). More tasks with adjunctive materials.
	___ Small-Team	
	___ Larger-Team	
	___ Multi-Unit	
	___ Command Staff Exercise	
H.1.3.2	LEVEL OF EVALUATION:	
	X Module Test	As developed by course designer.
	X Lesson Items	Each instructional unit can have embedded test items to access enroute as well as terminal performance.

FAMILY: H

MEMBER: 1

H.1.3	LEVEL OF EVALUATION (CONT'D)	COMMENTS
	X Individual Performance/SQT	Where remote terminal displays (augmented by off-line exhibits) and keyboard responses are appropriate to assess task performance.
	X Written (Textual keyboard)	
	___ Hands-On	
	___ Performance Certification	
	___ Team Exercise/ARTEP:	
	Positions or echelons interacting:	
H.1.4	CAPABILITIES:	
H.1.4.1	PRESENTATION:	
	a. Visual	
	X Alphanumeric	Limited to displayable character set of terminal, except for adjunctive materials.
	X Special Symbology	
	___ 2-D Graphics	
	___ 3-D Graphics	
	X Static Displays	
	___ Motion	
	___ Color	
	b. Auditory	
	___ Signals/Tones	
	___ Speech	
	c. Tactile	
	___ Size/Shape	
	___ Positional Cues	

FAMILY: H

MEMBER: 1

H.1.4.2	RESPONSE:	COMMENTS
	a. Verbal/Symbolic	
	X Choice Selection	As determined by course designer.
	X Specific Recall	Multiple-choice, constructed response,
	X Composed/Created	true/false are techniques that can be
	b. Performance	used.
	___ Indication	
	___ Manipulation	
	X Read/Interpret	Performance assessed by response matching
	___ Listen/Interpret	or not matching course. Designer pre-
	___ Voice Composition	determined answers.
	X Situation Evaluation	With situation on screen or print
	X Decide Action	exhibits.
H.1.4.3	TRAINING MANAGEMENT:	
	a. Feedback	
	X Informative	Capability available for all types
	X Evaluative	under control of course designer.
	X Corrective	
	X Summary	
	X Immediate	
	X Delayed	
	b. Presentation Control	
	X Learner	Self-paced, individualized instruction.
	X Media	
	X Instructor	Only as programmed by course designer.

FAMILY: H

MEMBER: 1

H.1.4.3	TRAINING MANAGEMENT (CONT'D)	COMMENTS
	c. Sequencing	
	X Linear	Sequence based on lesson design and how trainee responds. Decisions are based on historical, individual, performance records. Based on predetermined decision standards.
	X Response Branching	
	X History Branching	
	X Repetitive Practice	
	d. Recordkeeping	
	X Automatic (Temporary Storage)	Performance records can be output at printer. Using 1108 file management software.
	X Automatic (Permanent Storage)	
	___ Manual	
	___ None	
H.1.5	SETTING:	
H.1.5.1	X INSTITUTIONAL	
	X Service School	Available at USAFAS on remote terminal stations. See H.1.5.3, Requirements.
	___ Army Training Ctr (ATC)	
	___ Div/Post Installation Schools	
H.1.5.2	___ UNIT	
	___ In-System (Embedded)	Available at unit level wherever remote terminal and telephone lines can be established.
	___ Job-Station	
	X Individual Learning Ctr (ILC)	
	X Barracks/Home	
	X Garrison Training Area	
	___ Local Training Area	
	___ Major Training	
	___ National Range	

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H.1.5.3	X REQUIREMENTS:	COMMENTS
	Remote terminal (CRT or teletype), telephone line to Edgewood Arsenal, modem, line printer compatible with remote terminal. Area for student station.	
H.1.6	EXPORTABILITY:	
	___ In Units X Planning ___ No	Precise plans unknown.
H.1.6.1	INITIAL OPERATIONAL CAPABILITY DATE:	
	X Currently Available	At USAFAS. Other locations could access.
	___ Future Date	Could establish computer facility to
	___ Unknown	USAFAS with direct access to student stations.
H.1.6.2	METHOD:	
	___ Mail/Ship	
	___ Install	
	X Remote Access (Telecommunications)	Edgewood Arsenal UNIVAC 1108
	___ In System	
	___ Job Materials	
H.1.6.3	BASIS OF ISSUE:	
	X On Demand	Dependent on number of student stations
	___ Unit Issue	and telephone lines established.
H.1.6.4	SOURCE:	
	X Known	ARI coordination with Edgewood Arsenal.
	___ Probable	
	___ Unknown	

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H.1.7	SUPPORT REQUIREMENTS:	
H.1.7.1	LOGISTICAL SUPPORT:	COMMENTS
	X Storage Areas	Remote terminal, equipment, listings.
	X Spare Parts	Paper for terminal printer.
	___ Additional Copies On Hand	
	X Expendable Material	Off-line exhibits used with on-line instruction.
H.1.7.2	MAINTENANCE REQUIREMENTS:	
	X Yes ___ No	
	___ Operator	
	X Organizational Maintenance	For remote terminal and line printer.
	X Direct Support Maintenance	PLANIT software by ARI.
	X General Support Maintenance	PLANIT/UNIVAC interface by Edgewood
	___ Depot Maintenance	
H.1.7.3	MANNING REQUIREMENTS: Total = 2 or More	
	X System Operators	At Edgewood Arsenal.
	X Instructors/Facilitators	Monitor student terminal area, process
	___ Simulation/Monitor Positions	performance records.
	___ Support Personnel	
H.1.7.4	SCHOOL OPERATIONAL SUPPORT:	
	X Special Personnel Skills	Use of PLANIT and system operations.
	X Special Equipment	Terminals, printers, modems, phones.
	X Facility	Area to house user configuration.
	___ Reproduction	
	X Update	Relate ease of update.

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H.1.8	COST DATA:	COMMENTS
H.1.8.1	SYSTEM ACQUISITION:	
	___ High	
	___ Medium	
	X Low	Cost of remote terminal and line printer.
	___ None	
H.1.8.2	CURRENT OR PROJECTED OPERATIONAL COSTS:	
	___ High	
	___ Medium	
	X Low	Varies: $900 per month per phone line, USAFAS to Edgewood Arsenal. Computer costs $7.50 per hour.
	___ None	
H.1.8.3	MAINTENANCE COSTS:	
	___ High	
	___ Medium	
	X Low	Maintain user equipment and software.
	___ None	
H.1.8.4	TRAINING MATERIALS DEVELOPMENT:	
	___ High	
	X Medium	70 to 150 developmental hours to 1 hour of instruction.
	___ Low	
	___ None	
H.1.9	TRAINEE PREREQUISITES:	
	___ Education	
	X Physical Skills	Able to operate remote terminal keyboard.
	___ Mental Skills	
	___ MOS Requirements	
	X Aptitudes	Textual displays requires reading.
	___ Schools/Courses	
	___ Training	
	X Other	Prerequisites dependent on course material presented.
	___ None	

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H.1.10	ADDITIONAL COMMENTS SHEET:

APPENDIX C

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