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↙ The paper recommends contractor assistance rather than an in-house effort because: (1) While necessary array of resources required by this effort exists within the Army, it is doubtful that the Army could or would commit those resources to this system in the required quantity and quality at the right time; (2) A contractor provides continuity, flexibility, and credibility; (3) Since certain system components are purchased, there is a reduced likelihood that the system would be subverted through whimsical decisions, intuition, or trial and error. ↘

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HOW TO IMPLEMENT RETO (A REVIEW OF EDUCATION AND
TRAINING FOR OFFICERS) AT USACGSC

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

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HOW TO IMPLEMENT RETO (A REVIEW OF EDUCATION AND TRAINING FOR OFFICERS)
AT THE US ARMY COMMAND AND GENERAL STAFF COLLEGE, by Major William B.
Mack, USAF, 38 pages.

The purpose of this paper is to recommend a method to implement RETO. This method entails an Army managed, contractor assisted, application of Instructional System Development concepts and principles to solve the problem of curriculum management. The paper includes a detailed Statement of Work which specifies the contractor deliverable items by phase. The Statement of Work is a stand-alone document which can be extracted from this paper and used as necessary by Army program managers.

The paper recommends contractor assistance rather than an in-house effort because: (1) While the necessary array of resources required by this effort exists within the Army, it is doubtful that the Army could or would commit those resources to this system in the required quantity and quality at the right time; (2) A contractor provides continuity, flexibility, and credibility; (3) Since certain system components are purchased, there is a reduced likelihood that the system would be subverted through whimsical decisions, intuition, or trial and error.

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CHAPTER 1

INTRODUCTION

"Following the 1973 Mid-East war, the US Army Training and Doctrine Command began revising school curricula to emphasize technical competence in the operation and employment of weapons systems. Funds, however, were not available to lengthen the (existing) courses. The result--some of the more traditional subjects relating to officer effectiveness were dropped out. Despite the changes made, it was generally agreed in the Spring of 1977, that (the Army) was still not producing officers with the desired level of military competence.¹ With this background the Chief of Staff of the Army, in August 1977, directed Major General B. L. Harrison "to conduct a Review of Officer Education and Training (RETO) from precommissioning through career completion to determine requirements based on Army missions and individual career development needs, and to prepare policies and programs to meet those needs."²

1-1. Purpose

The purpose of this paper is to prescribe a systems approach to the implementation of RETO as it relates to the US Army Command and General Staff College (CGSC) and the Combined Arms Services and Staff School (CAS³).

1-2. Research Methodology

The notion that there was a need for a systems approach to curriculum management at CGSC was developed in stages as the author progressed through the course. Early observations aroused curiosities on how certain management functions were being performed. This led to suspicions that certain functions were not being performed as efficiently and effectively as possible. These suspicions prompted an informal survey which led the author to conclude that a definite need did exist for a systems approach to curriculum management.

Several faculty members were interviewed, resulting in further study in the following areas:

- (1). The RETO Report.³
- (2). The question of balancing education and training in the CGSC curriculum.⁴
- (3). The process of change at CGSC.⁵
- (4). The application of duty modules to the CGSC regular course.⁶
- (5). The application of Criterion Referenced Instruction at CGSC.⁷

After research confirmed the existence of Army consensus that a systems approach was necessary, it was decided that this effort should

prescribe a detailed methodology (statement of work) on how to design, develop, and implement a system.

In addition to the above research, the statement of work is also based upon the author's previous study and experience with Instructional System Development in the US Air Force. Although this history dealt primarily with the problems of aircrew training (B-1, A-7, A-10, F-4, F-15, F-16) the principles and concepts apply to any instructional system. In terms of resources, the problem is generally the same: how to optimize. In terms of learning, it is also the same: how to obtain the desired performance regardless of where it lies along the continuum of skills, from simple knowledge to synthesizing concepts and solving problems - for example, from completing an administrative form to leading effectively in combat.

1-3. The RETO Report

The most significant aspect of RETO is that it recommends a system.⁸ In so doing, RETO recommends broad changes of a general nature, such as phasing education and training throughout a career, who should attend what schools and when, and generally what skills should be taught. Although what to do is clear, RETO provides little guidance on how to do it. A "system" is emphasized as the necessary way to go. The education and training requirements of the Army can best be met through implementation of a "system." However, there is no definition of "system" provided in RETO so that a reader can test RETO's recommendations against some criteria to insure beyond reasonable doubt that the Army's requirements for education and training will be met. RETO does not explicitly show that its authors fully understand what is meant by "system." "What" to do is clear: "the Army needs to forecast

accurately and implement rationally the integration of equipment, people, and concepts."⁹ Further, system criteria are specified:

"1. It must be based upon Army missions - both peacetime and wartime.

2. It must satisfy career development needs.

3. It must combine self-development, unit development, and institutional development from initial selection as a potential officer through career completion.

4. It will be implemented in a constrained resource environment.

5. It should be consistent with the system for managing officer personnel.

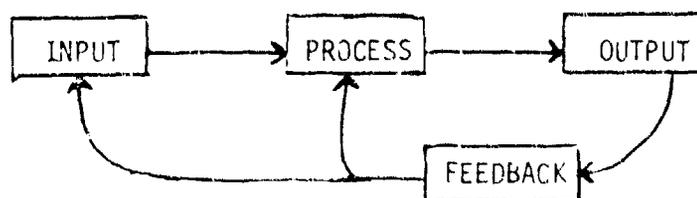
6. It should be implemented in such a way that an officer's career is neither truncated nor despoiled because of the happenstance of transition from old system to new.

7. It should be consistent with the development and preservation of commitment."¹⁰

"How" to do it, is the intent of this paper. However, in order to insure understanding, the term "system" as it is used herein should be defined.

1-4. System

"System" is nothing more than input, process, output with feedback from output to both process and input:



Most systems are really subsystems of some larger system, and open systems are those which integrate with their environment. These facts are the most important to understand. If a subsystem does not link with other subsystems and major systems, it will fail. If a system does not integrate properly and smoothly with its environment, it will die. Environment for a system consists of anything that acts upon the system or reacts to it. Included are such things as other systems or subsystems, organization (both formal and informal), people, equipment, communications, decisionmaking, management, constraints, and concepts. Not only must the system integrate externally with its environment, it must integrate internally its input, process, output, and feedback with such things as people, time, money, expertise, hardware, and software. By their very nature, systems provide a management methodology to best meet the need to integrate, to meet objectives, and to optimize efficiency and effectiveness. The more complex the problem, such as the problem of meeting the Army's needs for military competency, the more appropriate is a systems approach.

The USACGSC is a subsystem in itself. It is an extremely dynamic subsystem with a need to adapt effectively to its ever changing environment. Change itself has been the most constant characteristic of the College throughout its long history.¹¹

1-5. Organization

Chapter 2 contains the Statement of Work in as near final form as possible. However, before contractor procurement can begin, certain minor adjustments will be necessary. Resource scheduling, time phasing, funding, and organizational matters will need finalization through

in-house coordination. Since the Statement of Work is a stand-alone document, certain redundancies exist in Chapter 2 and are intentional. For example, the Statement of Work needs its own limited bibliography to direct prospective bidders to additional background information.

In addition to recommendations and rationale for contractor support, Chapter 3 lists critical ingredients necessary to make this effort successful.

ENDNOTES

CHAPTER 1

1. Harrison, A Review of Education and Training for Officers (Washington: Department of the Army, 30 June 1973), p. v.
2. Ibid., p. vi.
3. Ibid.
4. Vought and Binkley, Fort Apache or Executive Suite? The U.S. Army Enters the 1980's. Parameters, Journal of the U.S. Army War College, Vol. VIII, No. 2, June 1978.
5. Doughty, The Command and General Staff College in Transition, 1946-1976, Special Study Project, Department, Department of Strategy (Fort Leavenworth, Kansas: U.S. Command and General Staff College, May 1976).
6. Norris and Robbins, A Feasibility Study: The Application of Duty Modules to a Front-End Analysis of the Command and General Staff College Regular Course, Thesis, Master of Military Art and Science, (Fort Leavenworth, Kansas: U.S. Command and General Staff College, 1976/1977).
7. _____, Curriculum Committee Reports, Phase B, Term 1, 77-78 16 December 77, and RC Course 78-2, 18 May 78 (Fort Leavenworth Kansas: U.S. Command and General Staff College).
8. Harrison, p. 1.
9. Ibid, p. I-1.
10. Ibid, p. IV-1.
11. Doughty, p. 6.

CHAPTER 2

THE US ARMY COMMAND AND GENERAL STAFF COLLEGE (USACGSC) AND THE COMBINED ARMS SERVICES AND STAFF SCHOOL (CAS³) STATEMENT OF WORK

Figure 1

Deliverables by Phase.

ANALYSIS

Phase 1 review
Phase 2 review
Detailed work plan
Data collection and management forms
CGSC review
Phase 3 review
Task and goal analysis
Requisite skills, knowledges, and behaviors
Target population analysis
Management functional analysis
Objectives and tests
Evaluation/performance measurement
Use of data automation
Program/system constraints
Forms, documents, course materials printing/reproduction
Phase 3 update

DESIGN

Phase 4 review
Curriculum/system management plan
Management criteria
Management system forms and documents
Instructional material design
Instructional module design
Validation
Revision and Maintenance
Faculty requirements
Learning center
Facilities requirement
Instructional system media
Cost benefit analysis
Phase 4 update

DEVELOPMENT

Phase 5 review
Curricula (CGSC, CAS³, faculty training)
Instructional materials
Management system
Media
Facilities
ADP support
Validation
Maintenance and revision system
Implementation schedule
Phase 5 update

IMPLEMENTATION

Phase 6 review

Phase 6 update

Phase 7 review

Phase 7 update

EVALUATION

Final report

Reports and bibliography

1.0 INTRODUCTION. A Review of Education and Training for Officers (RETO) was established by Chief of Staff Memorandum (CSM) of 31 August 1977 with a mission "...to determine officer training and education requirements based on Army missions and individual career development needs. Based on those requirements, develop training and education policies and programs which combine self-development, unit development, and institutional development in a phased schedule from precommissioning or preappointment training through career completion. Develop these programs with the prospect of implementation in a constrained environment; present the integration of approved programs in the FY 1980-84 program."

The RETO report was published in June 1978 recommending a "system" to meet Army needs. The US Army Command and General Staff College (USACGSC) will implement RETO's recommendations in an environment of rapidly changing requirements and budgetary constraints. Consequently every effort must be made to create a comprehensive, properly designed system that will be capable of providing effective education and training in a variety of missions in the future characterized by

changing enemy threat and modern complex weapons systems. Construction of such education and training begins with the development of a balanced and efficient instructional system supported by a rigorous task/skill/knowledge data base and a responsive management program. The effort which this statement of work initiates is intended to provide just such an instructional system for USACGSC.

1.1 The Instructional Systems Development (ISD) concept will form the basis for this effort. ISD provides guidelines for addressing the tasks of planning, data collection, analysis, media development/selection, curriculum development, time phasing, and overall system management. It is an approach that has been used extensively in the production of instructional programs for scholastic systems, industry, and the military services. Army, Navy, Air Force and Coast Guard uses of ISD have been extensive and have achieved impressive results.

2.0 BACKGROUND. The continued emphasis which RETO places on a systems approach underscores the Army's need for this process as a management tool. Implementation of systems approaches has optimized costly resources by identification of those skills, knowledges, behaviors, and attitudes that directly impact mission performance and by concentration of those skills, knowledges, behaviors, and attitudes during the instructional process.

2.1 To a large extent, systems approaches to instruction depend upon the thoroughness and accuracy of the data base derived from the analysis process. Accordingly, analysis will constitute a primary part of this effort.

2.2 Measurable skills and knowledges do not comprise the sum total of what must be learned by the student. Affective skills such as judgement, attitude, decisionmaking, perception, leadership, and problem solving are neither directly measurable or quantifiable, but are crucial to mission effectiveness. A Goal Analysis will, therefore, be conducted to identify pertinent affective skills, analyze (to the extent possible) components and provide instructional guidelines for teaching these skills as part of the USACGSC and CAS³ instructional system.

2.3 Curriculum content, instructional strategies and media selection decisions have been made intuitively in the past. In consequence, validation processes have frequently resulted in major program revision. This effort should minimize such costly errors through clear identification of correct subjects, methods, and time phasing. Further, performance requirements will drive selection, design, and implementation of teaching methods, instructional strategies, media, and support. Such assessments will lead to yet unidentified media and refinement of existing media such as gaming devices. Compilation of cost-benefit data for the variety of options available to the instructional system designer will be a primary component of this effort.

2.4 A characteristic deficiency of previous ISD efforts has been the lack of optimization. Lack of effective planning has resulted in improper sequencing of events and ineffective and inefficient instruction. Detailed planning will be characteristic of this effort. This will force logical progression beginning with analysis. The design phase will result in a "blueprint" and development will not proceed until the design blueprint is approved. Validation will precede implementation

wherever practical. Quality control and revision functions will be ongoing.

2.5 It is recognized that this effort does not begin from a zero-based perspective, and that almost 100 years experience of trial and error has yielded proven methods of instruction. This effort must be kept within that context; however, this must not constitute a constraint against change. Any existing methods that result in system optimization should be incorporated and refined where possible.

3.0 SCOPE. This effort shall apply ISD technology to provide a total cost effective system of the implementation and management of education and training at USACGSC and CAS³ in order to meet Army requirements through the year 2000 time frame.

3.1 PROGRAM SCHEDULE. This effort is driven by RETO and USACGSC milestones for implementation in FY 80 to 84.

3.2 CONSTRAINTS AND LIMITATIONS. The tasks and technical requirements identified within this statement of work are not to be construed as limiting parameters. This effort shall require creative and innovative techniques.

3.3 SPECIALIZED PERSONNEL. This effort is broad in scope. The spectrum of expertise and background required in addition to subject matter expertise includes:

- (1). Systems Analysis and Management
- (2). Educational Technology
- (3). Instructional Psychology
- (4). Data Automation

- (5). Simulation
- (6). Gaming
- (7). Media Development
- (8). Performance Measurement

3.4 RESOURCES. USACGSC will provide the following which will effect the development and implementation of the training system:

- (1). Definition of constraints
- (2). Regulations, Manuals, Publications
- (3). Definition (general) of requirements
- (4). Dedicated subject matter experts at the equivalent of 2 manyears per year from each department to interface with contractor personnel.
- (5). Dedicated Technical Representative of the Contracting Officer (TRCO) for overall management, to review and provide recommendations, and acceptance of deliverable items.

3.5 SITE. The combined Army and contractor personnel team will be provided adequate office space and facilities within Bell Hall, Fort Leavenworth, Kansas.

4.0 TECHNICAL REQUIREMENTS/TASKS. The contractor shall produce and deliver an instructional system to include analysis, design, development, implementation, and evaluation that will satisfy education and training requirements of USACGSC and CAS³. Reports and reviews shall be in accordance with Annex A. Data collection and analysis conducted during Phase 1 through Phase 3 shall provide the basis for optimum and

alternative recommendations for design, development, and implementation of the instructional system. System development shall be based upon the plan recommended by the contractor after approval and modification if necessary by the Army. The system will be implemented by the Army and shall be validated and revised by the contractor in accordance with the validation and implementation plans recommended by the contractor after modification/approval by the Army. Although the technical requirements are time phased, the contractor shall update for currency and accuracy all system analyses, data, documents, materials, programs, products, and solutions as new data/information becomes available from the contractor and Army sources throughout the life cycle of the contract.

4.1 PHASE 1 REVIEW. The contractor shall schedule the Phase 1 review 10 days after contract award. The Phase 1 review shall be in accordance with Annex A, Reviews and Reports. The purpose of the Phase 1 review is to establish initial contact, to hold general discussions, and review technical requirements/tasks.

4.2 PHASE 2 REVIEW. The contractor shall schedule the Phase 2 review 45 days after contract award. The phase 2 review shall be in accordance with Annex A, Reviews and Reports. The purpose of the Phase 2 review is to discuss the detailed work plan for the entire effort.

4.2.1 DETAILED WORK PLAN FOR THE ENTIRE EFFORT. The contractor shall recommend all data collection and management forms and present examples, rationale and instruction on the use and purpose of each form for Army approval and modification if necessary. Data collection and management forms are defined as those forms to be used during gathering, processing and revising data information to be used in system analysis and design.

Examples include task analysis and objectives worksheets. Note: Data collection and management forms described in this paragraph are not to be confused with system management forms and documents specified in para 4.4.1.1.

4.2.3 CGSC REVIEW. In preparation for this effort the contractor shall review the following.

- (1). Current CGSC procedures, policies and plans
- (2). The US Army Review of Education and Training for Officers. (RETO)
- (3). The Command and General Staff College in Transition, 1946-1976.
- (4). CGSC effort to implement Criterion Referenced Instruction (CRI).
- (5). Current CGSC objectives.
- (6). Current CGSC data base.
- (7). College catalog.
- (8). Previous Army Research Institute (ARI) reports.

4.3 PHASE 3 REVIEW. The phase 3 review shall be scheduled and presented by the contractor at the end of phase 3 in accordance with annex A, Reviews and Reports. Although analysis is on-going throughout the life cycle of a system the primary analysis effort shall be conducted during this phase. Data collection in this phase will serve as the basis for additional analysis during phase 4 (design), phase 5 (development), phase 6 (implementation) and phase 7 (evaluation). Categories of analysis to be conducted in phase 3 include task analysis, goal analysis and target population analysis, and management functional analysis.

4.3.1 TASK AND GOAL ANALYSES. The contractor shall provide the task and goal analyses which shall be the basis for the curriculum. The task and goal analyses shall be used to accomplish the following objectives:

- (1). Determinations of required knowledges, skills, behaviors, attitudes.
- (2). Translation of knowledges, skills, behaviors and attitudes into objectives, performance goals, and tests which clearly and accurately state what performance is required, under what conditions and to what standard.
- (3). Arrangement of objectives and performance goals into prerequisite hierarchies wherever a prerequisite relationship among objectives can be found.
- (4). Based upon objectives and performance goals the contractor shall specify the system including what to teach, when to teach, where to teach, how to teach, and how to test.

4.3.1.1 REQUIRED SKILLS KNOWLEDGES, AND BEHAVIORS. As a result of the task and goal analyses the contractor shall specify the knowledges, skills and behaviors required and translate them into objectives and performance goals. As a part of this analysis, attention must be paid to different types of skills, knowledges and behaviors. Different instructional strategies and media are appropriate for different types of objectives. For example, if the required behavior is to be able to complete a supply requisition form, a programmed test or a given example of a completed form might teach the behavior in the most efficient and effective manner. In this case the media and instructional strategies would be basically simple. If on the other hand, the required behavior

involved synthesizing concepts to solve problems, then media and instructional strategies would be more complex perhaps using simulations, games, or exercises. In each case the instructional strategy and media were selected based on the criterion that the instruction should duplicate reality as closely as practical.

4.3.1.2 GOAL ANALYSIS. Goal analysis is a method of specifying behavior based upon abstract states. The contractor must assure that affective skills such as judgment, decisionmaking, perception, leadership and problem solving are included. The analysis of behavior based upon a goal must provide definition of the behavior and a method to evaluate the behavior to determine whether it has been learned to the extent required by the system.

4.3.2 TARGET POPULATION ANALYSIS. The contractor shall perform target population analysis of both students and instructors who will enter the CGSC and CAS³ systems. The analysis will review expected entry level knowledges, behaviors, educational background and experience. The contractor shall incorporate the results of this analysis into system design so that instruction is appropriate to satisfy career development needs of all categories of students.

4.3.3 MANAGEMENT FUNCTIONAL ANALYSIS. The contractor shall perform an analysis to determine all functions that are integral to the system. At least four major categories of functions must be included:

1. Conduct instruction
2. Manage the conduct of instruction
3. Analyze, design, develop, implement and evaluate the system
4. Manage the analysis, design, development implementation and

evaluation of the system.

For each major functional category, all subfunctions necessary to support that activity must be identified. For each sub-function determinations must be made to include:

- (1). Who performs it, when, and how
- (2). What resources are required, when and how much

Examples of sub-functions in each category include:

1. Lecture, test, conduct practical exercises.
2. Schedule students, instructors, facilities, media.
Maintain the library learning center, Print Plant, TASO.
3. Conduct task analysis, develop objectives, tests, lesson plans, exercises.
4. Plan/program support. Keep instruction current. Validate feedback.

4.3.4 OBJECTIVES AND TESTS. The contractor shall provide objectives and tests derived from the task and goal analyses. Objectives and tests shall be determined by specifying the required performance in terms of skills, knowledges, behaviors, the conditions under which the behavior will be performed, and the criteria to which the performance will be measured.

4.3.5 EVALUATION/PERFORMANCE MEASUREMENT. The contractor shall provide documented recommendations and rationale for evaluating how well the student meets the objective for each performance. Recommendations shall include a detailed statement of what the evaluation system shall consist of, the method of record keeping, what shall be evaluated, and the relationship of the evaluation to the instructional system.

4.3.6 BASE OF DATA AUTOMATION. The contractor shall make detailed recommendations on the use of automatic data processing (ADP) to support any of the functions identified in the management functional analysis. The contractor shall review each function for potential optimization through ADP support. The recommendations shall include consideration of current plans, programs, and resources. Cost benefit analysis shall be included for each option recommended. Recommendations must meet management system criteria listed in paragraph 4.4.1.2. Recommendations for implementation of ADP support shall include time phased schedules showing modular growth and functional integration of both hardware and software.

4.3.7 PROGRAM/SYSTEM CONSTRAINTS. The contractor shall review, investigate, and report on situations where it is appropriate to deviate from restrictions imposed by constraints. In each case the contractor shall provide rationale to support a deviation, change, or waiver. As a minimum the following constraints shall be reviewed and investigated:

- (1). Facilities
- (2). Resources
- (3). Regulations, Policies, Procedures
- (4). Personnel

4.3.8 FORMS DOCUMENTS COURSE MATERIALS PRINTING/REPRODUCTION: The contractor shall review current printing and reproduction procedures and make recommendations on optimizing this support to the instructional system.

4.3.9 PHASE 3 UPDATE. The contractor shall ensure that all documentation,

data reports, deliverables, and the detailed work plan are updated for technical accuracy, comprehensiveness, and currency prior to the phase 3 review. The detailed work plan shall be approved/modified if necessary prior to contract continuation into phase 4.

4.4 PHASE 4 REVIEW. The phase 4 review shall be scheduled and presented by the contractor at the end of phase 4 in accordance with Annex A, Reviews and Reports. Phase 4 shall consist of the design plan or "blue print" for developing the system during phase 5. As a minimum, this phase shall address the planned method for satisfying the system's functional requirements identified in the Management Functional Analysis including:

1. Instructional Material design
2. Instructional Module design
3. Validation
4. System Maintenance and Revision Documentation
5. Documentation
6. Faculty requirements, (Selection, training/enhancement, subject matter expertise, currency)
7. Learning Center
8. Facilities Requirement
9. Media (selection, development, support)
10. Management Criteria
11. ADP
12. Cost Benefit Analysis
13. Sensitivity Analysis

4.4.1 CURRICULUM/SYSTEM MANAGEMENT PLAN. The contractor shall submit the curriculum/system management plan for Army approval. The management

plan will detail the planning factors, objectives and scope required to provide a management system for curriculum implementation, validation and revision.

4.4.1.2 MANAGEMENT CRITERIA. The contractor shall ensure that the Management System meets the needs of users at all levels. The contractor shall specify the criteria that the management system will meet. The contractor shall specify in detail how the criteria will be met. As a minimum, the following criteria shall be included.

- a. Cost-effectiveness
- b. User orientation. For example, information must be readily accessible and pertinent. The system must be simple.
- c. Flexibility. The system must accommodate individual student needs through strategies such as self-pacing and individualized instruction lecture, and practical exercises.
- d. Responsiveness. The system must be responsive to external pressures such as changing Army requirements, increased/decreased students/faculty personnel, changing Army missions, doctrine, and weapons systems. The system must be responsive to internal pressures such as changes resultant from validation procedures, feedback, and data updates. The system must be responsive to change.
- e. ADP support must be used oriented, provide real time output, and must not be constrained by time-sharing requirements.
- f. Relevance. The system must be relevant to constraints identified in paragraph 4.3.7.

4.4.1.1 MANAGEMENT SYSTEM FORMS AND DOCUMENTS. The contractor shall

examine existing management system forms and documents such as planning charts, schedules, and reports and make recommendations with rationale for the following:

- (1). Optimize use of existing Army management forms and documents
- (2). Modify existing forms and documents
- (3). Provide new contractor procured, Army approved forms and documents.
- (4). Combination of the above.

4.4.2 INSTRUCTIONAL MATERIAL DESIGN. The contractor shall investigate and evaluate current course material design procedures and policies and recommend specific options that will meet instructional system requirements. As a minimum, the investigation and evaluation shall consider all issue material and lesson plans.

4.4.3 INSTRUCTIONAL MODULE DESIGN. Instructional modules shall be catalogued in a format which offers optimum ease of use by system managers and students and meet the criteria of paragraph 4.4.1.2.

4.4.4 VALIDATION. The contractor shall recommend with rationale in the design plan, the method and schedule for validation of the entire instructional system during development, implementation and evaluation. (Phases 5 through 7.) The contractor shall validate as much of the system as possible prior to implementation.

4.4.5 REVISION AND MAINTENANCE. The contractor shall develop procedures, materials, and methods to revise and maintain the training system. Emphasis will be placed on identifying and satisfying revision requirements

so that students receive the latest, most current information available. Flow of external information from all sources should be provided. For example, data from on-going operational testing must flow directly into the system. Emphasis shall be placed on methods to evaluate established programs, determination of merit of proposed changes, and ease of change implementation.

4.4.6 FACULTY REQUIREMENTS. The contractor shall review faculty requirements and make recommendations including: qualification, selection, tenure, continuity, training, maintaining currency in their areas of expertise, and interface with doctrinal and combat development. Training recommendations shall include how to implement and manage current and future instructional systems including how to perform curriculum management functions.

4.4.7 LEARNING CENTER. The contractor shall evaluate the Learning Center and make recommendations to include:

- a. Cost effectiveness
- b. Utilization
- c. Functions
- d. Requirements

4.4.8 FACILITIES REQUIREMENT. The contractor shall evaluate current and planned facilities configuration and make recommendations relative to system support. Factors to be considered include use of small group seminars, lectures, simulations, gaming, and realism.

4.4.9 INSTRUCTIONAL SYSTEM MEDIA. The contractor shall identify and describe all potential instructional media required to support the

instructional system. The required media shall be described in terms of life cycle costs, instructional utility, hardware and software characteristics, instructional features, manpower, facilities and support. The contractor shall perform cost-benefit analysis for all media options recommended. As a minimum the contractor shall investigate and evaluate the following media:

- a. Lectures
- b. Seminars
- c. Programmed texts
- d. Computer Assisted Instruction (CAI)
- e. Audio visual programs
- f. Simulators
- g. Field exercises
- h. Games
- i. Practical Exercises

4.4.10 COST-BENEFIT ANALYSIS. The contractor shall perform cost-benefit analysis to all system options that recommend additional procurement of instructional system hardware or software such as new/modified Media, CAI, and facilities. As a minimum the following will be included:

- a. Assumptions regarding capability and ready for use dates
- b. Cost (acquisition, life cycle, and support)
- c. Instructional benefits (reduced costs and improved efficiency or effectiveness)

4.4.11 PHASE 4 UPDATE. The contractor shall ensure that all documentation, data, reports and the detailed work plan are updated for technical accuracy, comprehensiveness, and currency prior to the phase 5 review.

The detailed work plan shall be approved/modified if necessary prior to contract continuation into phase 5.

4.5 PHASE 5 REVIEW. The phase 5 review shall be scheduled and presented by the contractor at the end of phase 5 in accordance with Annex A, Reviews and Reports. Phase 5 shall consist of development of the entire instructional system in accordance with the design blueprint formulated during phase including:

4.5.1 CURRICULA (CGSC, CAS³, FACULTY TRAINING).

4.5.2 INSTRUCTIONAL MATERIALS.

4.5.3 INSTRUCTIONAL MODULES.

4.5.4 MANAGEMENT SYSTEM.

4.5.5 MEDIA.

4.5.6 FACILITIES.

4.5.7 ADP SUPPORT.

4.5.8 MAINTENANCE AND/REVISION SYSTEM.

4.5.9 IMPLEMENTATION SCHEDULE. The contractor shall provide a recommended schedule showing a time phased plan for implementation of the instructional system which will allow a reasonable growth period to full system implementation.

4.5.10 PHASE 5 UPDATE. The contractor shall perform the phase 5 update in accordance with procedures in paragraph 4.411.

4.6 PHASE 6 REVIEW. The contractor shall schedule the phase 6 review at the end of phase 6 in accordance with Annex A, reviews and reports. Phase 6 shall consist of implementation of the instructional system in accordance with the approved detailed work plan and implementation

schedule.

4.6.1 PHASE 6 UPDATE. The contractor shall perform the phase 6 update in accordance with procedures in paragraph 4.4.11.

4.7 PHASE 7 REVIEW. The contractor shall schedule the phase 7 review at the end of phase 7 in accordance with Annex A, reviews and reports. Phase 7 shall consist primarily of continued implementation validation and evaluation.

4.7.1 EVALUATION. Evaluation and quality control are management functions that occur throughout the life cycle of the instructional system. The contractor shall include the results of these functions in all reviews and reports submitted in accordance with Annex A, Reviews and Reports.

4.7.2 FINAL REPORT. The contractor shall submit the final report which shall include, as a minimum, all findings, recommendations, rationale and all supporting details and data.

4.8 REPORTS AND BIBLIOGRAPHY. All reports, studies and bibliographies collected by the contractor to perform this program shall be deliverable items at the end of each phase.

5.0 SPECIAL CONSIDERATIONS:

5.1 PERSONNEL QUALIFICATIONS. All personnel assigned to work on the contract must be individuals whose experience qualified them without question for the task.

5.2 TERMINOLOGY. The contractor shall state all findings and

recommendations in firm positive terms. Nebulous or ill defined statements are to be avoided. In all written communications and materials, the contractor will avoid, where possible, the use of specialized engineering, human factors, or psychological terminology unless the terms are fully defined. It is the intent of this contract that the reports and other materials will communicate clearly with the Army education and training community.

ANNEX A

Reviews and Reports

1. Phase 1 Review. The purpose of the phase 1 review is to provide general orientation to the problem and the introduction of contractor and Army personnel who will participate in the program. This review shall be informal with no specific oral or written reports required.

2. PHASE REVIEWS 2 thru 7. The contractor shall give an oral report of program results and detailed work plan for the subsequent phase. Written summaries of the findings/conclusions of each phase and the detailed work plan for the subsequent phase shall also be prepared and delivered to the Army one week prior to the phase review. Each phase review shall contain sufficient documentary evidence of the various program analyses, design plans, implementation plans and products to allow a thorough evaluation of the methodology, findings, recommendations, results and plans. The written reports shall include whatever tables, diagrams, charts, sketches, schematics, and narrative to adequately explain the phase results and plan for subsequent phases. The plan for each subsequent phase shall include a chart to which projects monthly expenditures throughout that phase. This projection shall be compared with actual expenditures in each monthly report submitted according to paragraph 4 below. Prior to initiation of the next phase the contractor shall complete each phase to the satisfaction of the Army and receive written approval from the Army for contract continuation (Phase 1 excepted).

3. QUARTERLY REVIEWS. The contractor shall present informal quarterly program reviews to review progress and plans and discuss problem areas

(Phases 3 thru 7). Quarterly reviews falling at the end of a phase shall be combined with the end of phase review.

4. MONTHLY PROGRESS REPORTS. The contractor shall submit monthly progress reports containing a summary of significant results and activities for the previous month. Significant problems and planned task deviations shall be included along with names of persons and places visited. Problems encountered, and assistance required from the Army should be handled immediately upon occurrence directly or by telephone or letter and should be covered in the monthly report. Monthly progress reports due at the end of phase 3 through 7 should be combined with the end of Phase review.

ANNEX B

BIBLIOGRAPHY

1. Educational System Planning

Kaufman, Roger A. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

2. Analyzing Performance Problems

Mager, Robert F. and Pipe, Peter; Lear Siegler, Inc/Fearon Publishers, Belmont, California.

3. Developing Attitude Toward Learning

Mager, Robert F. Lear Siegler Inc/Fearon Publishers, Belmont, California.

4. Goal Analysis

Mager, Robert F. Fearon Publishers, Belmont, California.

5. Preparing Instructional Objectives

Mager, Robert F. Fearon Publishers, Belmont California.

6. Interservice Procedures for Instructional Systems Development, Volume 1-6.

CHAPTER 3

CONCLUSIONS AND RECOMMENDATIONS

3-1. Conclusions and Recommendations

Recommendations are as follows:

a. There is an urgent need for the Army to adopt a systems approach to curriculum management for CGSC and CAS³. RETO proposes a system but says little about how to manage that system to insure that it meets its own goals and objectives, but more importantly, to insure that the system meets the requirements of the Army. RETO proposes another change to the curriculum based on a cursory analysis of officer skills. This change is to be in effect through 1990. How does RETO know what the system's external environment will be in 1990? Another change in the curriculum is not what is needed to solve the problem. What is needed is a system to manage change so that CGSC will always meet the needs placed upon it by its environment.

b. A dedicated, ad hoc study group be convened to implement RETO.

c. Contractor assistance should be purchased through a competitive procurement to support this effort with management control under USACGSC.

3-2. Contractor Assistance

Contractor assistance is recommended primarily due to the scope of this effort and the subsequent requirement to input a broad spectrum of expertise. To implement, this system will require an extensive

effort of analysis, design, and development. It will require dedication skills and technology not necessarily available. The subject matter expertise of the faculty in such areas as combined arms, tactics, and logistics must be combined with technologies such as Educational Psychology/Technology, systems management, Data automation, Instructional technology, Simulation, gaming, media development, and performance measurement. A contractor under Army management can complement those existing technologies and synthesize them into an optimum working system.

The question will come up: "Why hire a contractor to do what we know more about than anyone else?" Contractor assistance is recommended because it provides many basic necessities. It is true that the Army and the CGSC organization possess more expertise in what is being taught than can be found anywhere else. However it is doubtful that the Army could or would commit expertise in all the other arts and sciences that are requisite to this system in the right quantity and quality at the right time. A contractor would be required to do this, which leads to another question: "Is this statement of work beyond the state of the art?" The answer is no. This sort of approach has been successful in industry, Department of Defense, Technical schools, liberal arts colleges, dental schools and others.

The need for continuity in a systems life cycle is met through careful planning and management, especially of personnel resources. Contractor assistance will insure continuity.

A contractor has more flexibility than the military to program and provide for changing resource requirements during the program. Different requirements exist in different phases. For example,

different quantities of analysis related technologies are required during the analysis phase than are required during implementation and evaluation phases.

A contractor with a history of success in similar efforts can add credibility that sometimes does not otherwise exist in in-house efforts. Whether or not this should be true is certainly questionable, however, experience has shown that it is true.¹

This same experience has shown that when certain system components are purchased, there is reduced likelihood that the system will be subverted by whimsical decisions. In other words, once a system is on-line and operating effectively, its own control mechanisms will be employed. For example, rather than implement a change to the curriculum because of someone's intuition or personal desire, a suggested change will first undergo systematic analysis and validation to determine whether or not it will optimize efficiency and effectiveness in (1) meeting curriculum objectives, or (2), optimize the manner in which the curriculum meets the needs of the Army.

3-3. Management.

The management philosophy must be that this is not a contractor effort. The contractor merely provides resources to an Army program in terms of expertise and manpower augmentation. Success or failure will be attributed to the Army and not the contractor. Army and contractor personnel must work together as an integrated, coordinated team with overall management responsibility belonging to the Army. Reviews and reports provide built-in controls. In addition, where practical, end of phase should correspond to the end of fiscal years. This will allow subsequent years to be considered as option years with continuation

depending on satisfactory performance. Also it is likely that this program would be funded annually. Finally, update requirements and phasing would guarantee that the Army would have completed products if for some reason the contract was terminated at some interim phase.

3-4. Procurement

The procurement should be managed locally. Program managers should be responsible for source selection and comprise the technical evaluation team. They should insure that the selected contractor thoroughly understands the problem, has proven past performance, and has necessary technical competence. Contractor teaming should be encouraged. The level of effort should be appropriate to technical requirements. Innovative, creative applications should be present. This is a developmental effort, however it should not be funded under Research and Development as this complicates procurement and reduces local management control. A hardware exclusion should be considered. This will exclude the media device profit seekers, limiting proposals to serious educational systems contractors. The statement of work is specific and will result in very specific proposals.

3-5. Critical Factors

Certain factors are critical to the success of this program:

a. The right contractor must be selected. Close coordination between program managers and procurement officers will insure this.

b. The Army must commit adequate subject matter expertise and management personnel. In addition to the Technical Representative of the Contracting Officer, and subject matter experts, a program management team must be dedicated. The level of Army input must be determined

through in-house coordination. To a large degree, this will depend upon availability of people and expertise. In any case, the level of input must be specified to potential contractors in terms of manyears and type so that the contractor can bid a level of effort necessary to augment the Army team.

d. The program must have support, especially from higher headquarter echelons. Understanding is required. This is accomplished by keeping the right people informed and by making the program visible.

ENDNOTES

1. Evidence of this claim can be found in several recent examples:
Cal-Span Inc. (B-1), Courseware Inc. (F-15 and F-16), Veda Inc. (F-14-
U.S. Navy).

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