

MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



EXECUTIVE SUMMARY  
SKILL QUALIFICATION TEST SCORING AND FEEDBACK  
ECONOMIC ANALYSIS

I. Introduction: The economic analysis compares Automated Local Scoring, Manual Local Scoring, and Regional Local Scoring to the current Centralized Scoring System (baseline). The basic intent is to assist in determining the most cost effective way to provide timely and useful Feedback on SQT to individual soldiers and the chain of command/training managers. It will assist in making a decision whether or not to continue with the current scoring system, which does not meet system goals, or implement a new or modified system.

II. Cost Analysis: The technique of "differential cost analysis" is used in the study. Costs common to all alternatives were not addressed since they have no bearing on the selection of one alternative over the others. The total dollar cost for each alternative was discounted at 10% over an eight year life cycle. On a scale of 0 to 100, the least expensive is assigned a value of 100, the most a value of 0.

III. Data Collection:

1. During the period June - December 1980, data were collected to allow analysis of five attributes of all systems considered. These attributes are:

- a. Cost
- b. Speed of ISR Feedback
- c. Effectiveness of Unit Summary Reports
- d. Manpower Increases Required for System Operation
- e. Error Resolution of Mark-Sense Forms

2. Empirical data were collected for Alternatives 1, 2, and 3. Alternative 4 is conceptual and was developed during the conduct of the six month field evaluation of Alternatives 2 and 3. Technology exists to support this alternative and reasonably accurate estimates of the attributes above were drawn for inclusion in this analysis.

IV. Benefit Analysis:

1. Any SQT Scoring and Feedback System must provide for the accomplishment of the objectives listed below:

- a. Provide accurate, useful, and timely SQT feedback to the individual soldier.
- b. Provide accurate, useful, and timely SQT feedback to the supervisor and trainer/training manager.
- c. Provide for mark-sense form error resolution at the source of the error.

2. Accomplishment of these objectives will alleviate the complaints of the current system and improve the Army's readiness posture through more effective and timely management of training. FORSCOM alone expends approximately 350 million dollars annually for readiness training. Although it is difficult to quantify SQT benefits, it is easy to recognize that even small increases in efficiency provide substantial payoffs. The discussion of alternate benefits will focus on their ability to accomplish the objectives in 1 above.

3. Alternative 1, Centralized Scoring, is the baseline system, a four year old operational system reflecting no investment cost. It has been able to partially accomplish 1a and b (format); however, objective 1c has not been accomplished. Major benefits are the ease of management of a central system and avoidance of further capital expenditure for ADPE and related requirements.

4. Alternative 2, Automated Local Scoring, uses minicomputers and scanners at the local level to score the SQT and provide summary reports. Some of the ADPE from the Training Management Control System (TMACS), a FORSCOM developed system to be fielded in the near future, would be used to perform the scoring and feedback functions. A sixmonth field evaluation was conducted at Ft Bragg and in USAREUR. This alternative was analyzed using two contingencies (a) Alternative 2A reflects the cost of using purchased ADPE and (b) Alternative 2B reflects leased ADPE cost. This alternative is able to partially meet objectives 1a and (timeliness and format). It partially satisfies objective 1c by ensuring 52% of mark-sense form error resolution is accomplished at the source of the errors. This alternative is dependent upon a reduced version of Alternative 1, Centralized Scoring, remaining in place.

5. Alternative 3, Manual Local Scoring, uses a machined plastic overlay template to hand grade each SQT. Grading is accomplished by an NCO at the test site on the same day the soldier is tested. The soldier is provided with unofficial feedback and the supervisor with a Job Book Insert reflecting the soldier's performance. This alternative was evaluated at Ft Knox, Korea, and USAREUR during the July - December 1980 period. Alternative 3 was analyzed using two contingencies (a) Alternative 3A considers the time spent by NCO's to grade SQT as an "opportunity cost" and (b) Alternative 3B ignores the "opportunity cost" of the scoring NCO. This alternative is the most costly in terms of dollars and manpower. It partially meets objective 1a (timeliness), but cannot accomplish objectives 1b or c. The training manager must manually keep track of individual performance to identify common deficiencies within an MOS and skill level until summary data is received from the central system. Alternative 1, Centralized Scoring, remains intact under this alternative.

6. Alternative 4, Regional Local Scoring, combines the major benefits of the other alternatives. Functionally, the local TMACS ADPE (with scanners) would scan and store images of the SQT mark-sense form.

On a scheduled basis, these images would be transmitted via electronic means to a larger computer serving a region and several local TMACS computers. The regional computer would score the SQT, creating files from which all reports for all echelons could be produced. ISR and unit summaries would be transmitted back to the originating local computer where all printing would take place. This alternative was analyzed using two contingencies (a) Alternative 4A reflects the cost of purchased ADPE and (b) Alternative 4B reflects leased ADPE cost. This alternative was conceptualized during the field evaluation when it became apparent that the other alternatives could not fully satisfy the objectives in 1a, above. Alternative 4 is not so decentralized as to become unmanageable because of SQT scoring template changes. On the contrary, electronic data links using state of the art technology allow interactive systems that minimize disruptions from template changes. The addition of the interactive capability makes this alternative far more desirable and responsive to the functional user. This alternative is dependent upon a significantly reduced version of Alternative 1, Centralized Scoring, remaining in place. Alternative 4 accomplishes all objectives.

#### V. Conclusions and Recommendations.

1. The "additive weighting technique" was used to rank the alternatives. Using this technique it was necessary to examine the attributes used to compare the alternatives and assign a weight factor to each. Better performance by any alternative in error resolution has a positive effect on both ISR feedback speed and summary report effectiveness; error resolution is deemed the most beneficial attribute and is more heavily weighted. Cost is considered the least weighted attribute provided others are met. ISR and summary feedback attributes are equally weighted between error resolution and cost (equally weighted with manpower). The attribute weighting scale and weighting factors used in this analysis are shown below:

<u>ATTRIBUTE</u>	<u>WEIGHT SCALE</u>	<u>WEIGHTING FACTOR</u>
Error Resolution	2.0	.28
ISR Speed	1.5	.22
Summary Effectiveness	1.5	.22
Manpower	1.0	.14
Cost	1.0	<u>.14</u>
		1.0

2. Ranking the alternatives clearly show alternative 4 to be the most preferred. (See chart below.)

Attribute (ATT)	ALTERNATIVE								Weighting Factors
	1	2A	2B	3A	3B	4A	4B		
ERROR RESOLUTION	0	52	52	0	0	100	100	.28	
INDIV FEEDBACK SPEED	0	93	93	100	100	93	93	.22	
SUMMARY REPORT EFFECTIVENESS	0	100	100	0	0	100	100	.22	
ADDITIONAL MANPOWER	100	85	85	0	0	83	83	.14	
COST	100	90	92	0	45	85	80	.14	
	28	81.5	81.8	22	28.3	94	93.3		

WEIGHTED SUM

a. Since Alternative 4A is conceptual only, recommend it be operationally tested as soon as possible to confirm or refute the attributes and benefits shown in this analysis and to establish firm cost and functional capabilities.

b. Recommend the review of this analysis following such testing to reconfirm findings of preference for this alternative.

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US ARMY TRAINING BOARD  
AN ACTIVITY OF THE US ARMY TRAINING SUPPORT CENTER  
CRAIG A. HAGAN, COLONEL, USA, PRESIDENT

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**Signed/CRAIG A. HAGAN**

CRAIG A. HAGAN  
COL, IN  
President

## ABSTRACT

This study was prepared for the Commanding General, Training and Doctrine Command, by the United States Army Training Board, Fort Eustis, Virginia.

The purpose of this study is to perform an economic analysis to determine the most cost effective way to provide timely and useful feedback on SQT to individual soldiers and their chain of command/training managers. The current centralized scoring system was used as the baseline and compared against local manual scoring, local automated scoring (both of which were evaluated for six months), and a conceptual regional local scoring concept. The basic intent is to assist in making a decision concerning whether or not to continue with the current scoring system, which does not meet system goals, or implement a new or modified system.

The technique of "differential cost analysis" is used in the study. Costs common to all alternatives have no bearing on the selection of one alternative over another.

The comparison of alternatives in this study are based on (1) cost; (2) speed of feedback for the individual; (3) effectiveness of feedback for commanders; (4) resolution of mark-sense form errors at the source of the error; and (5) manpower required to operate the system. The results of the study indicate that the potential benefits of the regional local scoring concept are significantly greater than any of the other alternatives.

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I. PROJECT TITLE: Economic Analysis of Skill Qualification Test (SQT)  
Scoring and Feedback Systems

II. DATE SUBMITTED: 31 January 1981

III. SUBMITTING ACTIVITY: US Army Training Board

IV. ECONOMIC ANALYSIS OBJECTIVE: To determine the most cost effective  
way to provide timely and useful  
feedback on SQT to individual  
soldiers and the chain of  
command/training managers.

## V. PROBLEM STATEMENT.

1. The Army must provide Skill Qualification Test (SQT) feedback to tested soldiers and trainers/training managers in a useable form and in a timely fashion. The current system, which scores all SQT at a central location (Ft. Eustis, VA), is not achieving these goals.
2. Soldiers are often confused when they do receive SQT results. The time lag between testing and feedback is often so great that soldiers have forgotten test details and feedback format does not always tell them what performance measures within a task were missed. Consequently, soldiers cannot make effective use of SQT feedback for individual training reinforcement.
3. The goal of the current system is to provide SQT feedback on unit collective performance (by MOS) on a scheduled basis. The system goal is to provide company level summaries on 60 day cycles with battalion and higher level summaries provided on 90 and 120 day cycles. Commanders have indicated that these reports should arrive sooner to have the optimum utility for management and planning of training.
4. Error resolution for the mark-sense form which carries the soldiers' responses to SQT is presently performed centrally. Errors often cause the form to be returned by U.S. mail to the originator for correction. This procedure adds significantly to the total time required to produce useable feedback. Currently, only approximately 40% of the tests submitted are free of errors of any kind.

## VI. ENVIRONMENT.

1. The SQT scoring/feedback system must service active components, National Guard, and Army Reserve units. Up to one million tests may be submitted for scoring in a single year.
2. The system must provide performance reports to the individual and commanders on those tasks tested for training diagnostic purposes. Reports must also be provided to MACOM and Department of the Army for personnel management purposes and TRADOC schools for product improvement.
3. Tests are administered in three components: the Hands on Component (HOC), the Job Site Component (JSC) and the Written (Skill) Component (SC). The component results are consolidated onto a mark-sense form by a local Training Standards Officer (TSO), presently comprising 175 Active Army, 69 Reserve Component, and 108 National Guard personnel. The forms are then mailed to Fort Eustis, Virginia, for grading by an automated central system which also produces all feedback reports.
4. SQT is a peacetime system. During mobilization or actual combat the requirement to administer SQT and provide feedback is scheduled to cease.

## VII. OBJECTIVES.

1. Provide an easily manageable system of scoring SQT and providing necessary reports and feedback.
2. Provide timely feedback to individual soldiers which will provide information that allows the soldier and supervisor alike to take corrective action to improve individual skills.
3. Provide timely feedback to commanders and training managers which will identify weaknesses and trends in individual skill performance.

## VIII. ASSUMPTIONS/CONSTRAINTS.

1. The requirement to administer, score, and provide feedback from the SQT will continue in the foreseeable future (eight years for analysis purposes).
2. The scoring and feedback system must service each enlisted soldier whether active, reserve, or national guard.
3. Funds and manpower to support any system will continue to be constrained; increases in either are unlikely, unless significant increases in benefits (i.e., cost effectiveness) can be shown.
4. Any system must be capable of scoring up to one million individual soldiers in a year.
5. A minimum of two thousand (2,000) separate tests may be active during any one year. These tests are written by branch schools and are subject to frequent change. Fully 50% of the SQT scoring templates in effect at the beginning of a test period can be expected to change at least once before the period ends.
6. Any automated system which locally scans and scores SQT will use the ADPE which operates primarily as the Training Management Control System (TMACS).
7. SQT III, using improved ADPE and a single page mark-sense form for scoring, will be completely functional by 4th Qtr, FY 81.
8. Despite assumption 5 above, for all alternatives described here, it is assumed that the administration of the SQT will not change up thru the point that the soldier takes the skill component and completes the single page mark-sensed answer sheet. The TSO then completes the form by coding the results of the HOC and JSC. Distribution of the feedback from the TSO to the individual/unit is the same regardless of alternative.

IX. ALTERNATIVES.

1. CENTRALIZED SCORING. This is a "no change" alternative. Mark-sense forms are batched by each TSO and mailed to the Army Training Support Center. Sheets are scanned and graded by computer. Individual Soldier's Reports (ISR) are transmitted to TSO, generally using existing AUTODIN facilities. Command summaries and reports for DA are also produced.

a. Advantages.

- (1) No additional ADPE costs.
- (2) No software development and maintenance costs not already planned as part of current system.
- (3) No changes in manpower requirements.
- (4) The alternative is a fully developed, functioning system, requiring no "break-in" phase.

b. Disadvantages.

- (1) Needs of field for rapid feedback of ISR will continue unfulfilled.
- (2) Significant improvements in error resolution of mark-sense forms is not likely. The current centralized system is four years old and has achieved only a 40% error free rate to date.
- (3) Unit Summary Reports produced on 60-day cycles (company) and 90-120 day cycles (battalion and higher) do not meet commanders needs for timely and effective feedback.
- (4) Local commanders have little or no influence/control over testing, scoring, or feedback.

2. AUTOMATED LOCAL SCORING. This alternative envisions using scanners and minicomputers at the division/installation level to score the mark-sense forms from SQT. Some of the computers of the Training Management Control System (TMACS), a FORSCOM developed system scheduled to be fielded in CY 81, would be used to perform the scoring and feedback. A six month (July-December 1981) field evaluation of this concept was conducted at Fort Bragg and in USAREUR. An extract of pertinent empirical data is at Inclosure 1. This alternative is considered feasible as evaluated only if the error resolution and template change problems, cited as disadvantages below, can be overcome.

a. Advantages.

(1) Official ISR are provided rapidly to the soldier and his supervisor.

(2) Unit Summary Reports are produced on demand of the commander or selected MOS, a defined test period, or other criteria.

(3) Approximately 52% of the errors on mark-sense forms are resolved locally, greatly reducing their effect on feedback time.

(4) Scheduling of scoring and feedback of SQT is controlled by the local commander with priority as determined by that commander.

b. Disadvantages.

(1) Earliest Army-wide use of the system would be no sooner than mid CY 82. Implementation is dependent upon the fielding of TMACS equipment, which is not fixed at the time of this report.

(2) System implementation would require additional costs in dollars and manpower.

(3) Enlisted Master File edits (name, SSAN, unit match) cannot be performed locally. This would require retention of a portion of the current centralized system to perform this function and the production of high level reports and item analysis.

(4) Daily processing time (see Incl 1) would degrade the primary function of the TMACS computers.

(5) Expected changes in the scoring templates for individual SQT could not be effectively managed.

(a) A minimum of 57 separate computers will perform scoring and feedback and require accurate templates.

(b) At least 2,000 separate templates requiring four magnetic diskettes for storage will be in effect at one time.

(c) During the life of this system, it is conservatively estimated that a minimum of 50% of the templates in effect would require change prior to the end of a test period. Since the ISR produced locally is to be an official document, the templates used must be accurate. The volume of changes and number of diskettes required present a monumental logistics problem. Worldwide dispersion and the limitations of the ADPE dictate mailing as the only means to distribute these template changes. System managers could never be assured that users in the field did, in fact, receive and were using current templates. Each change would also

mean rescoring each like SQT previously scored, thus further degrading the TMACS function. The volume and frequency of template changes are not expected to decrease significantly during the life cycle of the system.

3. **MANUAL LOCAL SCORING.** This alternative uses a machined plastic overlay template to hand grade each SQT. Grading is accomplished by an NCO at the test site on the same day as testing. The soldier is provided with unofficial feedback and a Job Book Insert reflecting his performance. Manual local scoring was evaluated at Fort Knox, USAREUR, and Korea during the June-December 1980 period. This alternative is not considered feasible for implementation unless the template change disadvantage outlined below can be overcome.

a. Advantages.

- (1) Provides the most rapid feedback to the soldier.
- (2) Involves the supervisor more directly in the scoring and feedback process (via Job Book).

b. Disadvantages.

- (1) Feedback is unofficial and does not provide detailed item analysis.
- (2) Requires complete retention of the current system to produce official feedback and unit summaries.
- (3) System implementation would require additional costs in dollars and manpower.
- (4) Template changes (see 2c above) have an even greater impact than in Alternative 2. Each TSO (352 of them) would require a copy of each of the templates for every MOS (total: 2000+). The volume and frequency of template changes would cause an unmanageable logistic problem at both the production and user level. Storage, security, and maintenance of the correct templates could not properly be managed with any degree of certainty that the correct templates were in use throughout the Army.
- (5) As a result of (4) above, production of official ISR, utilizing the central system at Ft. Eustis would have a high probability of differing from the results obtained thru local manual scoring and the credibility of the system would suffer accordingly.
- (6) Requires significant increases in manpower for operation.
- (7) Does not improve mark-sense form error resolution.

4. REGIONAL/LOCAL SCORING. This alternative combines some features of Alternative 2 (Automated Local Scoring), with new concepts. Functionally, the TMACS computers, equipped to locally score, would scan and store images of the SQT mark-sense form responses. On a scheduled basis, these images would be transmitted via electronic means to a larger computer serving a region and several local TMACS computers. The regional computer would score the SQT, creating files from which all reports for all echelons could be produced. ISR and unit summaries would be transmitted back to the originating local computer where all printing would take place. The regional computer would also perform Enlisted Master File edits. A master computer at Ft. Eustis would interactively control all template changes to the regional computer. All regrades would be accomplished at the regional level on a real-time basis on command of the master computer. Local computers would perform significant edits on mark-sense form input. Combined with the edit capabilities of the scanner, resolution of virtually all errors would be performed locally. AC, USAR and NG personnel not serviced directly by a TMACS computer would mail their completed mark-sense forms directly to the closest local computer.

a. Advantages.

- (1) Official ISR can be provided to tested soldier rapidly.
- (2) Unit Summaries (up to division level) can be produced rapidly on demand using specific unit, MOS, test periods, or other parameters.
- (3) Interactive regional computer and electronic data links to the master computer provide a manageable template change capability, negating assumption VIII 5.
- (4) Significant error resolution at the local level enhances shorter feedback time for any given soldier.
- (5) Scanning, transmitting, and printing of SQT and resulting reports are controlled by the local commander within his established priorities.

b. Disadvantages.

- (1) Earliest Army-wide use of the system is dependent upon meeting ADP and communication regulatory mandates. With maximum assistance from all concerned agencies this would be no sooner than late CY 82.
- (2) System implementation would require additional costs in dollars and manpower.

## X. COST ANALYSIS.

In computing costs for alternatives, differential cost analysis is used. Costs common to all alternatives are not reflected since they have no bearing on the selection of one alternative over another. Where equipment or personnel are used in more than the SQT function, costs are prorated to reflect only the portion dedicated to SQT.

1. CENTRALIZED SCORING (Alternative 1). Reflects the cost of operating the current centralized scoring and feedback system at Ft. Eustis, Virginia for an eight year life cycle. This is an operational system which reflects no investment costs.

2. AUTOMATED LOCAL SCORING (Alternative 2).

a. This alternative is considered infeasible as evaluated (see IX 2b). If, however, the system were fielded without requirement for template changes other than annually, costs would be as shown. This analysis, in effect, ignores the template change portion of assumption VIII 5.

b. Costs were analyzed from two perspectives: lease of ADPE unique to the SQT scoring application (Alternative 2A) purchase of that ADPE (Alternative 2B).

c. Costs reflect retention of the necessary portions of the current system (MACOM & DA reports).

3. MANUAL LOCAL SCORING (Alternative 3).

a. This alternative is considered infeasible as evaluated (see IX 3b). If, however, the system were fielded without requirement for template changes other than annually, costs would be as shown. This analysis, in effect, ignores the template change portion of assumption VIII 5. The analysis includes the manpower and logistics for the alternative as evaluated plus costs for the current centralized system (Alternative 1) which must be retained.

b. Costs of the manual scoring are shown from two perspectives:

(1) As evaluated (Alternative 3A) the unit having soldiers take an SQT provides a Non-Commissioned Officer to hand-score the answer sheets of those soldiers. The time spent by that NCO (30 minutes per tested soldier) is considered an "opportunity cost", i.e., the NCO's normal duties require other activity, but because of his scoring the opportunity is lost. The NCO's salary and benefits accrue whether he scores or not and the value of his time is lost if one activity is done at the expense of another. There is, however, no potential to realize real savings since the NCO will draw the same salary regardless of tasks assigned.

(2) The second perspective (Alternative 3B) ignores the "opportunity cost" of the scoring NCO.

4. REGIONAL/LOCAL SCORING (Alternative 4).

a. This analysis considers the additional costs of five regional computers communicating with both the local computers (Alternative 2) and the master computer (Alternative 1).

b. Some changes in manpower of Alternatives 1 and 2 are noted and costs are included. Two contingencies are analyzed: (Alternative 4A) purchase of ADPE; (Alternative 4B) lease of ADPE.

5. Pay rates used in this analysis:

a. Civilian Pay Rates.

(1) Regular time (no overtime). Used rate for Step 4 of the indicated grade and added 12.6% (retirement, life insurance, and health benefits per FONECON Accounting Policy and Systems Branch, DCSRM, TRADOC).

GS-12	\$29,645 + 12.6% (\$3,735) = \$33,380
GS-11	\$24,736 + 12.6% (\$3,117) = \$27,853
GS-9	\$20,445 + 12.6% (\$2,576) = \$23,021
GS-7	\$16,711 + 12.6% (\$2,106) = \$18,817
GS-6	\$15,040 + 12.6% (\$1,895) = \$16,935
GS-5	\$13,493 + 12.6% (\$1,700) = \$15,193
GS-4	\$12,058 + 12.6% (\$1,519) = \$13,577
GS-3	\$10,744 + 12.6% (\$1,354) = \$12,098

(2) Overtime. Computed as an average of all overtime pay rates for Step 4 of the above grades, or \$12.25 per hour. Annual rate per one (1) man-year (\$12.25 x 2080 hours) equals \$25,480.

b. Military Pay Rates. The rates used were based on USAFAC msg (DACA-FAA-G), 201924Z Nov 80, subject: FY 81 Annual Composite Standard Wages. Forty percent (40%) was added to the rates cited for retirement and other costs to the government.

05	$\$40,458 + 40\% (\$16,183) = \$56,641$
03	$\$29,483 + 40\% (\$11,793) = \$41,276$
E7	$\$19,422 + 40\% (\$7,769) = \$27,191$
E6	$\$16,402 + 40\% (\$6,561) = \$22,963$
E5	$\$13,779 + 40\% (\$5,512) = \$19,291$
E4	$\$11,841 + 40\% (\$4,736) = \$16,577$

6. The following discount factor table was taken from AR 18-1:

SQT LSE PROJECT YEAR DISCOUNT FACTORS

<sup>a</sup> TABLE 1

Present Value of \$1 (Single amount--to be used when cash-flows accrue in different amounts each year).

<u>Project Year</u>	<u>10%</u>
1	0.954
2	0.867
3	0.788
4	0.717
5	0.652
6	0.592
7	0.538
8	0.489
9	0.445

<sup>a</sup> Factors are based on continuous compounding of interest at the stated effective rate per annum, assuming uniform cash flows throughout stated one-year periods. These factors are equivalent to an arithmetic average of beginning and end of the year compound amount factors found in standard present value tables.

NOT USED

TABLE 2

Part I ADP Expenses (\$000)	Office: OMIS Date: 31 Jan 81		Alternative: Alt 1 Centralized Scoring							
	1Q	3Q	82	83	84	85	86	87	88	89
In-house Personnel Resources										
a. Civilian Man-Years			2.75	11	11	11	11	11	11	11
Civilian End Strengths			11	11	11	11	11	11	11	11
b. Military Man-Years			.5	2	2	2	2	2	2	1.5
Military End Strengths			2	2	2	2	2	2	2	2
Capital Investments--Total										
a. Purchase of New ADPE										
b. Purchase of Leased ADPE										
c. Purchase of Other Equipment										
d. Site Preparation										
In-house Operations--Total			112.9	451.4	451.4	451.4	451.4	451.4	451.4	338.6
a. Civilian Salaries & Overtime			70.5	281.9	281.9	281.9	281.9	281.9	281.9	211.4
b. Military Base Pay & Allowances			9.9	39.5	39.5	39.5	39.5	39.5	39.5	29.7
c. Supplies			32.5	130	130	130	130	130	130	97.5
d. Training										
e. Other										
Commercial Contract Services--Total			65	274	274	274	274	274	274	100.5
a. Leased ADPE Rentals & Maintenance			65	274	274	274	274	274	274	100.5
b. ADPE Time										
c. Systems Analysis & Programming										
d. Maintenance of Owned ADPE										
e. Other										
Inter and Intra Agency Services										
a. Payments to Others										
b. Reimbursement from Others										
Total Cost (NET)			177.9	725.4	725.4	725.4	725.4	725.4	725.4	439.1
Total Cost by Appropriation										
MPA			9.9	39.5	39.5	39.5	39.5	39.5	39.5	29.7
OMA			168	685.9	685.9	685.9	685.9	685.9	685.9	409.4
OMAR										
OPA										
RDTE										
DISCOUNT FACTOR:			.954	.867	.788	.717	.652	.592	.538	.445
NET COST, DISCOUNTED:			169.7	628.9	571.6	520.1	473	346.6	315	286.3
TOTAL COST DISCOUNTED:				3506.6						
UNIFORM ANNUAL COST:			438.3							

ALTERNATIVE 1 - CENTRALIZED SCORING  
PART I

1. IN-HOUSE PERSONNEL RESOURCES

a. Civilian Man-Years.

(1) Software development and maintenance

7 programmers x 160 hours

per month x 12 months

= 7 man-years

(2) Computer operations

4 operators x 160 hours

per month x 12 months

= 4 man-years

b. Military Man-Years

2 programmers x 160 hours

per month x 12 months

= 2 man-years

2. CAPITAL INVESTMENT - TOTAL

N/A

3. IN-HOUSE OPERATIONS - TOTAL

a. Civilian salaries and overtime.

Costs are based on 1 GS-12, 4 GS-11's, 1 GS-9, 1 GS-7, 3 GS-6's,  
and 1 GS-5.

(1) Current FY -

.25 man-year x \$33,380

1.0 man-year x \$27,853

.25 man-year x \$23,021

.25 man-year x \$18,817

.75 man-year x \$16,935

.25 man-year x \$15,193

Overtime \$7,327

= \$70,483

(2) Out years -

1 man-year x \$33,380

4 man-years x \$27,853

1 man-year x \$23,021

1 man-year x \$18,817

3 man-years x \$16,935

1 man-year x \$15,193

Overtime \$29,307

= \$281,935

b. Military Base Pay and Allowances.

Costs are based on 1 E-6 and 1 E-4.

(1) Current FY -

.25 man-year x \$22,963

.25 man-year x \$16,577

= \$9,885

(2) Out years -

1 man-year x \$22,963

1 man-year x \$16,577

= \$39,540

c. Supplies.

Operational supply costs are based on an average cost of \$.13 per soldier scored.

(1) Current FY -

250,000 soldiers scored x \$.13

= \$ 32,500

(2) Out years -

1,000,000 soldiers scored x \$.13

= \$130,000

4. COMMERCIAL CONTRACT SERVICES - TOTAL

a. Leased ADPE Rentals and Maintenance.

All costs include maintenance. Individual items and costs per month are listed below:

Terminal w/keyboard \$140

90 CPS printer \$80

250 LPM printer \$466

MODEM \$1,000

Synch Data Set Connects \$83

B6810 Mainframe -

1st Five Years \$40,000 x 40%  
(SQT usage factor) \$16,000

2nd five years \$10,750 x 40%  
(SQT usage factor) \$4,300

(1) Current FY -

13 Terminals w/keyboard x \$420

3 Sets x \$3,000

3 Synch Connects x \$249

2 90 CPS printers x \$240

1 B6810 Mainframe x \$48,000

= \$63,687

(2) Out years -

21 Terminals w/keyboard x \$1,680

3 Sets MODEMS x \$12,000

3 Synch Connects x \$996

2 90 CPS printers x \$960

1 250 LPM printer x \$5,592

1 B6810 Mainframe thru FY 85 = \$192,000

Per year FY 82-85 = \$273,780

1 B6810 Mainframe FY 86 on = \$51,600

Per year FY 86-89 = \$133,380

NOT USED

TABLE 3

Part II Functional Expenses (\$000)	Office: FSD, SMD		Alternative: 1							
	Date: 31 Jan 81		Centralized Scoring							
	10							30		
	Current	FY 81	82	83	84	85	86	87	88	89
<b>In-house Personnel Resources</b>										
a. Civilian Man-Years	7	28	28	28	28	28	28	28	28	21
Civilian End Strengths	25	25	25	25	25	25	25	25	25	25
b. Military Man-Years	.5	2	2	2	2	2	2	2	2	1.5
Military End Strengths	5	2	2	2	2	2	2	2	2	2
<b>Capital Expenses--Total</b>										
a. Equipment purchases										
b. Other capital expenses (Identify by EOE) equipment										
c. Total capital expenses										
<b>In-house Operations--Total</b>										
a. Civilian Salaries & Overtime	131.1	524.5	524.5	524.5	524.5	524.5	524.5	524.5	524.5	393.4
b. Military Base Pay & Allowances	107.7	430.9	430.9	430.9	430.9	430.9	430.9	430.9	430.9	323.2
c. Supplies	.9	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	2.8
d. Training	.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
<b>Total Cost</b>	<b>131.1</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>524.5</b>	<b>393.4</b>
<b>Total Cost by Appropriation</b>										
MPA	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
OMA	116.6	466.6	466.6	466.6	466.6	466.6	466.6	466.6	466.6	350
OMAR										
OPA										
RDTE										
MCA										
OMANG										
CWRF										
AIF										
OTHER										
<b>DISCOUNT FACTOR:</b>	.954	.867	.788	.717	.652	.592	.538	.489	.445	
<b>NET COST, DISCOUNTED:</b>	125.1	454.7	413.3	376.1	342	310.5	282.2	256.5	175.1	
<b>TOTAL COST, DISCOUNTED:</b>	2,735.5									
<b>UNIFORM ANNUAL COST:</b>	3,419									

ALTERNATIVE 1 - CENTRALIZED SCORING  
PART II

1. IN-HOUSE PERSONNEL RESOURCES

a. Civilian Man-years

(1) 25 personnel (training technicians, file clerks, receiving clerks, and statistical assistants) x 160 hours per month x 12

= 25 man-years

(2) Military Man-years

2 personnel x 160 hours per month x 12 months

= 2 man-years

2. CAPITAL EXPENSES - TOTAL

NA

3. IN-HOUSE OPERATIONS - TOTAL

a. Civilian Salaries and Overtime.

Costs are based on 1 GS-9, 1 GS-7, 1 GS-6, 14 GS-4's, and 7 GS-3's.

(1) Current FY -

.25 man-year x \$23,021

.25 man-year x \$18,817

.25 man-year x \$16,935

3.50 man-years x \$15,193

1 man-year x \$13,577

1.75 man-year x \$12,098

Overtime \$5,100

= \$107,718

(2) Out years -

1 man-year	x \$23,021	
1 man-year	x \$18,817	
1 man-year	x \$16,935	
14 man-years	x \$15,193	
4 man-years	x \$13,577	
7 man-years	x \$12,098	
Overtime	\$20,400	= \$430,869

b. Military Base Pay and Allowances.

Costs are based on 1 O-3 and 1 E-4.

(1) Current FY -

.25 Man-year	x \$41,276	
.25 Man-year	x \$16,577	= \$14,463

(2) Out years -

1 Man-year	x \$41,276	
1 Man-year	x \$16,577	= \$57,853

c. Supplies.

Operational supply costs based on \$124 per year per permanent and part time employee plus assigned military personnel. 30 x \$124

= \$ 3,716

d. Training.

\$100 per month		= \$ 1,200
-----------------	--	------------

e. Other.

Printing            \$22,000 per year

Contracts         \$ 4,500 per year

Travel             \$ 4,300 per year

= \$30,800

4. Civilian and military man-years are based upon past and present workload experience.

TABLE 4

Part I ADP Expenses (\$000)	Office: OMIS		Alternative: 2A									
	Date: 31 Jan 81		Automated Local Scoring - Purchase									
	1Q		3Q									
	Current FY 81	82	83	84	85	86	87	88	89			
<b>In-house Personnel Resources</b>												
a. Civilian Man-Years	2.9	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	8.6	
Civilian End Strengths	13	13	13	13	13	13	13	13	13	13	13	
b. Military Man-Years	5.25	58	58	58	58	58	58	58	58	58	43.5	
Military End Strengths	21	58	58	58	58	58	58	58	58	58	58	
Capital Investments--Total	495.6	822.5										
a. Purchase of New ADPE												
b. Purchase of Leased ADPE												
c. Purchase of Other Equipment												
d. Site Preparation												
<b>In-house Operations--Total</b>												
a. Civilian Salaries & Overtime	85.8	342.2	342.2	342.2	342.2	342.2	342.2	342.2	342.2	342.2	257.4	
b. Military Base Pay & Allowances	88.6	967.9	967.7	967.9	967.9	967.9	967.9	967.9	967.9	967.9	725.9	
c. Supplies	32.4	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	97.5	
d. Training												
e. Other	25.4	76.3										
<b>Commercial Contract Services--Total</b>												
a. Leased ADPE Rentals & Maintenance	43.2	187.4	187.4	187.4	187.4	187.4	187.4	187.4	187.4	187.4	74.7	
b. ADPE Time												
c. Systems Analysis & Programming												
d. Maintenance of Owned ADPE	10.7	111.2	111.2	111.2	111.2	111.2	111.2	111.2	111.2	111.2	83.4	
e. Other												
<b>Inter and Intra Agency Services</b>												
a. Payments to Others												
b. Reimbursement from Others												
Total Cost (NET)	781.8	2638.5	1739.7	1739.7	1739.7	1739.7	1739.7	1739.7	1739.7	1651.9	1651.9	1238.9
Total Cost by Appropriation												
MPA	88.6	967.9	967.9	967.9	967.9	967.9	967.9	967.9	967.9	967.9	725.9	
OMA	197.6	848.1	848.1	848.1	848.1	848.1	848.1	848.1	848.1	848.1	513.0	
OMAR												
OPA	495.6	822.5										
RDTE												
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.489	.445			
NET COST, DISCOUNTED:	743.8	2287.6	1370.9	1247.4	1134.3	977.0	888.7	807.8	551.3			
TOTAL COST DISCOUNTED:	10011.3											
UNIFORM ANNUAL COST:	1251.4											

ALTERNATIVE 2A - AUTOMATED LOCAL SCORING - PURCHASE  
PART I

1. IN-HOUSE PERSONNEL RESOURCES

a. Civilian man-years.

(1) Software development and maintenance

9 programmers x 160 hours per month x 12 months

= 9 man-years

(2) Computer operations

4 operators x 100 hours per month x 12 months

= 2.5 man-years

b. Military man-years.

(1) Software development and maintenance

1 programmer x 160 hours per month x 12 months

= 1 man-year

(2) Computer operations

57 operators x 160 hours per month x 12 months

= 57 man years

2. CAPITAL INVESTMENT - TOTAL

a. Purchase of new ADPE - current FY.

(1) 22 NCS 7001 scanners x \$15,750

(2) Upgrade 20 TMACS systems x \$6,055

(3) 2 IBM 5120 computing systems x \$21,000  
(minus 2 x \$7,000 accrued residuals)

= \$495,601

b. Purchase of new ADPE FY 82

(1) 38 NCS 7001 scanners x \$15,750

(2) Upgrade 37 TMACS Systems x \$6,055

= \$822,535

3. IN-HOUSE OPERATIONS - TOTAL

a. Civilian salaries and overtime.

Costs are based on 2 GS-12's, 5 GS-11's, 1 GS-9, 1 GS-7, 3 GS-6's, and 1 GS-5.

(1) Current FY -

.50 man-year x \$33,380

1.25 man-year x \$27,853

.25 man-year x \$23,021

.25 man-year x \$18,817

.75 man-year x \$16,935

.25 man-year x \$15,193

Overtime \$7,327

(2) Out years -

2 man-years x \$33,380

5 man-years x \$27,853

1 man-year x \$23,021

1 man-year x \$18,817

3 man-years x \$16,935

1 man-year x \$15,193

Overtime \$29,307

= \$343,168

b. Military base pay and allowances.

Costs are based on 1 E-6 and 57 E-4's.

(1) Current FY -

.25 man-year x \$22,963

5 man-years x \$16,577

= \$ 88,626

(2) Out years -

1 man-year x \$22,963

57 man-years x \$16,577

= \$967,852

c. Supplies.

Operational supply costs are based on an average of \$.13 per soldier scored and include diskette costs for SQT scoring on TMACS ADPE.

(1) Current FY -

250,000 soldiers x \$.13

= \$ 32,500

(2) Out years -

1,000,000 soldiers x \$.13

= \$130,000

d. Other.

(1) Current FY -

Travel and per diem for system expansion

= \$25,426

(2) Out years (FY 82 only) -

Travel and per diem for system extension

= \$76,349

= \$101,775

4. COMMERCIAL CONTRACT SERVICES - TOTAL

a. Leased ADPE Rentals and Maintenance.

All costs include maintenance. Individual items and cost per month are listed below:

Terminal w/keyboard \$140

90 CPS printer \$80

250 LPM printer \$466

MODEM \$1,000

Synch Data Set Connects \$83

B6810 Mainframe -  
1st five years \$40,000 x 25%  
(SQT usage factor) \$10,000  
2nd five years \$10,750 x 25%  
(SQT usage factor) \$2,688

(1) Current FY -

5 Terminals w/keyboard x \$420

3 sets MODEM x \$3,000

3 Synch connects x \$249

1 250 LPM printer x \$1,398

1 B6810 Mainframe x \$30,000

= \$ 43,245

(2) Out years -

13 Terminals w/printer x \$1,680

3 Sets MODEM x \$12,000

3 Synch Connects x \$996

1 90 CPS printer x \$960

1 250 LPM printer x \$5,592

1 B6810 Mainframe thru FY 85 x \$120,000

Per Year FY 82-85

= \$187,380

1 B6810 Mainframe FY 86-89 x \$32,256

Per Year FY 86-89

= \$ 99,636

b. Maintenance of Owned ADPE.

(1) Current FY -

(a) 2 IBM 5120 computing systems x \$132 x 12 months x .25

(b) 22 NCS 7001 scanners x \$150 x 12 months x .25

= \$ 10,692

(2) Out years -

(a) 2 IBM 5120 computing systems x \$132 x 2 x 12 months

(b) 60 NCS 7001 scanners x \$150 x 12 months

= \$111,168

TABLE 5

Part II Functional Expenses (\$000)	Office: FSD, SMD Date: 31 Jan 81		Alternative: 2A Automated Local Scoring -Purchase						
	IQ							30	89
	Current FY 81	82	83	84	85	86	87	88	
In-house Personnel Resources									
a. Civilian Man-Years	5.75	23	23	23	23	23	23	23	17.25
Civilian End Strengths	20	20	20	20	20	20	20	20	20
b. Military Man-Years	.5	2	2	2	2	2	2	2	1.5
Military End Strengths	2	2	2	2	2	2	2	2	2
Capital Expenses--Total									
a. Equipment purchases									
b. Other capital expenses (Identify by EOE) equipment									
c. Total capital expenses									
In-house Operations--Total	114.4	457.3	457.3	457.3	457.3	457.3	457.3	457.3	342.8
a. Civilian Salaries & Overtime	91.1	364.3	363.3	364.3	364.3	364.3	364.3	364.3	273
b. Military Base Pay & Allowances	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
c. Supplies	.8	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.3
d. Training	.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
Total Cost	114.4	457.3	457.3	457.3	457.3	457.3	457.3	457.3	342.8
Total Cost by Appropriation									
MPA	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
OMA	99.9	399.4	399.4	399.4	399.4	399.4	399.4	399.4	299.4
OMAR									
OPA									
RDTE									
MCA									
OMANG									
CWRF									
AIF									
OTHER									
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.489	.445
NET COST, DISCOUNTED:	109.1	396.5	360.4	327.9	298.2	270.7	246	223.6	152.5
TOTAL COST, DISCOUNTED:	* 2384.9								
UNIFORM ANNUAL COST:	298.1								

\*With template change @ \$62.2 annually  
total cost, discounted = \$2716.3

ALTERNATIVE 2A  
AUTOMATED LOCAL SCORING (PURCHASE)  
PART II

1. IN-HOUSE PERSONNEL RESOURCES.

a. Civilian Man-Years.

(1) 20 personnel (training technicians, file clerks, and statistical assistants) x 160 hours per month x 12 months

= 20 Man-years

(2) 3 part-time clerical personnel x 160 per month x 12 months

= 3 Man-years

b. Military Man-years.

2 personnel x 160 hours per month x 12 months

= 2 Man-years

2. CAPITAL EXPENSES - TOTAL.

NA

3. IN-HOUSE OPERATIONS - TOTAL

a. Civilian Salaries and Overtime.

Costs are based on 1 GS-9, 1 GS-7, 1 GS-6, 13 GS-5's, 2 GS-4's, and 5 GS-3's.

(1) Current FY -

.25 man-year x \$23,021

.25 man-year x \$18,817

.25 man-year x \$16,935

3.25 man-years x \$15,193

.50 man-year x \$13,577

1.25 man-years x \$12,098

Overtime \$5,100

= \$91,082

(2) Out years -

1 man-year x \$23,021

1 man-year x \$18,817

1 man-year x \$16,935

13 man-years x \$15,193

2 man-years x \$13,577

5 man-years x \$12,098

Overtime \$20,400

= \$57,853

c. Supplies.

Operational supply costs on \$124 per year per permanent and part-time employee plus assigned military personnel.

25 x \$124

= \$3,100

d. Training.

\$110 per month

= \$1,300

e. Other.

Printing \$22,000 per year

Contracts \$4,500 per year

Travel \$4,300 per year

= \$30,800

4. Civilian and military man-years are based upon past and present workload experience.

TABLE 6

Part I ADP Expenses (\$000)	Office: OMIS		Alternative: 2B						
	Date: 31 Jan 81		Automated Local Scoring Lease						
	1Q		3Q						
	Current FY 81	82	83	84	85	86	87	88	89
<b>In-house Personnel Resources</b>									
a. Civilian Man-Years	2.9	11.5	11.5	11.5	11.5	11.5	11.5	11.5	8.6
Civilian End Strengths	13	13	13	13	13	13	13	13	13
b. Military Man-Years	5.25	58	58	58	58	58	58	58	43.5
Military End Strengths	21	58	58	58	58	58	58	58	58
<b>Capital Investments--Total</b>									
a. Purchase of New ADPE	28								
b. Purchase of Leased ADPE									
c. Purchase of Other Equipment									
d. Site Preparation									
<b>In-house Operations--Total</b>	232.3	1517.4	1441.1	1441.1	1441.1	1441.1	1441.1	1441.1	1080.8
a. Civilian Salaries & Overtime	85.8	343.2	343.2	343.2	343.2	343.2	343.2	343.2	257.4
b. Military Base Pay & Allowances	88.6	967.9	967.9	967.9	967.9	967.9	967.9	967.9	725.9
c. Supplies	32.5	130.0	130.0	130.0	130.0	130.0	130.0	130.0	97.5
d. Training									
e. Other (TDY Per Diem)	25.4	76.3							
<b>Commercial Contract Services--Total</b>	96.2	759.4	759.4	759.4	759.4	759.4	759.4	759.4	503.7
a. Leased ADPE Rentals & Maintenance	95.4	756.2	756.2	756.2	756.2	756.2	756.2	756.2	501.3
b. ADPE Time									
c. Systems Analysis & Programming	.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	2.4
d. Maintenance of Owned ADPE									
e. Other									
<b>Inter and Intra Agency Services</b>									
a. Payments to Others									
b. Reimbursement from Others									
<b>Total Cost (NET)</b>	328.5	2276.8	2200.5	2200.5	2200.5	2200.5	2200.5	2200.5	1584.5
<b>Total Cost by Appropriation</b>									
MPA	88.6	967.9	967.9	967.9	967.9	967.9	967.9	967.9	725.9
OMA	211.9	1308.9	1232.6	1232.6	1232.6	1232.6	1232.6	1232.6	858.6
OMAR									
OPA	28								
RDTE	.954	.867	.788	.717	.652	.592	.538	.489	.445
<b>DISCOUNT FACTOR:</b>									
<b>NET COST, DISCOUNTED:</b>	313.4	1974	1734	1577.8	1434.7	1250.7	1142.0	1038.0	705.1
<b>TOTAL COST DISCOUNTED:</b>	11159.4								
<b>UNIFORM ANNUAL COST:</b>	1394.9								

ALTERNATIVE 2B - AUTOMATED LOCAL SCORING (LEASE)  
PART I

1. IN-HOUSE PERSONNEL RESOURCES.

Same as Alternative 2A.

2. CAPITAL INVESTMENTS - TOTAL.

2 IBM 5120 Computing Systems x \$21,000 (minus 2 x \$7,000 accrued residuals)

= \$28,000

3. IN-HOUSE OPERATIONS - TOTAL.

Same as Alternative 2A.

4. COMMERCIAL CONTRACT SERVICES - TOTAL.

a. Leased ADPE Rentals and Maintenance.

All costs include maintenance. Individual items and costs are shown below.

Terminal w/keyboard \$140

90 CPS printer \$80

250 LPM printer \$466

MODEM \$1000

Synch Data Set Connects \$83

B6810 Mainframe -  
1st five years \$40,000 x 25%  
(SQT usage factor) \$10,000  
2d five years \$10,750 x 25%  
(SQT usage factor) \$2,688

NCS 7001 scanner \$790

(1) Current FY -

5 Terminals w/keyboard x \$420  
3 Sets MODEMS x \$3,000  
3 Synch connects x \$249  
1 250 LPM printer x \$1,398  
1 B6810 Mainframe x \$30,000  
22 NCS 7001 scanners x \$2,370

= \$95,385

(2) Out years -

13 Terminals w/keyboard x \$1,680  
3 sets MODEMS x \$12,000  
3 Synch connects x \$996  
1 90 CPS printer x \$960  
1 250 LPM printer x \$5,592  
60 NCS 7001 scanners x \$9,480  
1 B6810 Mainframe thru FY 85 @ \$120,000 per year

Per Year FY 86-89

= \$668,436

b. Maintenance of Owned ADPE.

(1) Current FY -

2 IBM 5120 computing systems x \$132 x 12 months x .25

= \$792

(2) Out years -

2 IBM 5120 computing systems x \$132 x 12 months

= \$3,168

TABLE 7

Part II Functional Expenses (\$000)	Office: FSD, SMD		Alternative: 2B									
	Date: 31 Jan 81		Automated Local Scoring - Lease									
	10	Current FY 81	82	83	84	85	86	87	88	89	30	
<b>In-house Personnel Resources</b>												
a. Civilian Man-Years		5.75	23	23	23	23	23	23	23	23	17.25	
Civilian End Strengths		20	20	20	20	20	20	20	20	20	20	
b. Military Man-Years		.5	2	2	2	2	2	2	2	2	1.5	
Military End Strengths		2	2	2	2	2	2	2	2	2	2	
<b>Capital Expenses--Total</b>												
a. Equipment purchases												
b. Other capital expenses												
(Identify by EOE) equipment												
c. Total capital expenses												
<b>In-house Operations--Total</b>		114.4	457.3	457.3	457.3	457.3	457.3	457.3	457.3	457.3	342.8	
a. Civilian Salaries & Overtime		91.1	364.3	364.3	364.3	364.3	364.3	364.3	364.3	364.3	273	
b. Military Base Pay & Allowances		14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4	
c. Supplies		.8	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.3	
d. Training		.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1	
e. Other		7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1	
<b>Total Cost</b>		114.4	457.3	457.3	457.3	457.3	457.3	457.3	457.3	457.3	342.8	
<b>Total Cost by Appropriation</b>												
MPA		14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4	
OMA		99.9	399.4	399.4	399.4	399.4	399.4	399.4	399.4	399.4	299.4	
OMAR												
OPA												
RDTE												
MCA												
OMANG												
CWRF												
AIF												
OTHER												
<b>DISCOUNT FACTOR:</b>		.954	.867	.788	.717	.652	.592	.538	.489	.445		
<b>NET COST, DISCOUNTED:</b>		109.1	396.5	360.4	327.9	298.2	270.7	246	223.6	152.5		
<b>TOTAL COST, DISCOUNTED:</b>		*2384.9										
<b>UNIFORM ANNUAL COST:</b>		298.1										

\*With template changes @ \$62.2 annually  
total cost, discounted = \$2716.3

ALTERNATIVE 2B  
AUTOMATED LOCAL SCORING - LEASE  
PART II

SAME AS ALTERNATIVE 2A, PART II

TABLE 8

Part I ADP Expenses (\$000)	Office: OMIS		Alternative: 3A									
	Date: 31 Jan 81	Manual Local Scoring (with Local E6 Labor Opportunity Cost	81	82	83	84	85	86	87	88	89	
	1Q										3Q	
	Current FY		81	82	83	84	85	86	87	88	89	
In-house Personnel Resources												
a. Civilian Man-Years			2.75	11	11	11	11	11	11	11	11	8.25
Civilian End Strengths			11	11	11	11	11	11	11	11	11	11
b. Military Man-Years			.5	2	2	2	2	2	2	2	2	1.5
Military End Strengths			2	2	2	2	2	2	2	2	2	2
Capital Investments--Total												
a. Purchase of New ADPE												
b. Purchase of Leased ADPE			N/A									
c. Purchase of Other Equipment												
d. Site Preparation												
In-house Operations--Total			112.9	451.4	451.4	451.4	451.4	451.4	451.4	451.4	451.4	338.6
a. Civilian Salaries & Overtime			70.5	281.9	281.9	281.9	281.9	281.9	281.9	281.9	281.9	211.4
b. Military Base Pay & Allowances			9.9	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	29.7
c. Supplies			32.5	130	130	130	130	130	130	130	130	97.5
d. Training												
e. Other												
Commercial Contract Services--Total			65	274	274	274	274	274	274	274	274	100.5
a. Leased ADPE Rentals & Maintenance			65	274	274	274	274	274	274	274	274	100.5
b. ADPE Time												
c. Systems Analysis & Programming												
d. Maintenance of Owned ADPE												
e. Other												
Inter and Intra Agency Services												
a. Payments to Others												
b. Reimbursement from Others												
Total Cost (NET)			177.9	725.4	725.4	725.4	725.4	725.4	725.4	725.4	585.4	439.1
Total Cost by Appropriation												
MPA			9.9	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	29.7
OMA			168	685.9	685.9	685.9	685.9	685.9	685.9	685.9	685.9	409.4
OMAR												
OPA												
RDTE												
DISCOUNT FACTOR:			.954	.867	.788	.717	.652	.592	.538	.489	.445	
NET COST, DISCOUNTED:			169.7	628.9	571.6	520.1	273	346.6	315	286.3	195.4	
TOTAL COST DISCOUNTED:			3506.6									
UNIFORM ANNUAL COST:			438.3									

ALTERNATIVE 3A - MANUAL LOCAL SCORING  
(WITH LOCAL E6 LABOR OPPORTUNITY COST)

PART I

ADP EXPENSES

SAME AS ALTERNATIVE 1, PART I

TABLE 9

Part II Functional Expenses (\$000)	Office: FSD, SMD & LOCAL		Alternative: 3A							
	Date: 31 Jan 81	Manual Local Scoring with E6	82	83	84	85	86	87	88	89
	10	30								
	Current FY 81		82	83	84	85	86	87	88	89
In-house Personnel Resources	95	380	380	380	380	380	380	380	380	285
a. Civilian Man-Years	95	380	380	380	380	380	380	380	380	285
Civilian End Strengths	377	377								377
b. Military Man-Years	60.5	242								181.5
Military End Strengths	242	242								242
Capital Expenses--Total										
a. Equipment purchases										
b. Other capital expenses										
(Identify by EOE) equipment										
c. Total capital expenses										
In-house Operations--Total										
a. Civilian Salaries & Overtime	1320.4	5210	5210	5210	5210	5210	5210	5210	5210	3907.5
b. Military Base Pay & Allowances	1392.2	5569	5569	5569	5569	5569	5569	5569	5569	4176.8
c. Supplies	172		687.8	687.8	687.8	687.8	687.8	687.8	687.8	515.9
d. Training	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
Total Cost	2874.6	11498.4	11498.4	11498.4	11498.4	11498.4	11498.4	11498.4	11498.4	8623.5
Total Cost by Appropriation										
MPA	1392.2	5569	5569	5569	5569	5569	5569	5569	5569	4176.8
OMA	1482.5	5929.4	5929.4	5929.4	5929.4	5929.4	5929.4	5929.4	5929.4	4446.7
OMAR										
OPA										
RDTE										
MCA										
OMANG										
CWRF										
AIF										
OTHER										
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.492	.455	
NET COST, DISCOUNTED:	2742.4	9969.1	9060.7	8244.4	7497.0	6807.1	6186	5652	5116.8	
TOTAL COST, DISCOUNTED:	*61280.8									
UNIFORM ANNUAL COST:	7660.1									

\*With template changes @ \$1337.6 annually  
total cost, discounted = \$69380

ALTERNATIVE 3A  
MANUAL LOCAL SCORING (WITH LOCAL E6 LABOR OPPORTUNITY COSTS)

PART II  
FUNCTIONAL EXPENSES

1. IN-HOUSE PERSONNEL RESOURCES

a. Civilian man-years

(1) 377 personnel (training technicians, file clerks, receiving clerks, and statistical assistants) x 160 hours per month x 12  
= 377 man-years

(2) 3 part-time clerical personnel x 160 hours per month x 12  
months  
= 3 man-years

b. Military man years

242 personnel x 160 hours per month x 12 months  
= 242 man-years

2. CAPITAL EXPENSES - TOTAL

NA

3. IN-HOUSE OPERATIONS - TOTAL

a. Civilian salaries and overtime.

Costs are based on 1 GS-9, 1 GS-7, 1 GS-6, 14 GS-5, 356 GS-4, and 7 GS-3.

(1) Current FY -

.25 man-year x \$23,021

.25 man-year x \$18,817

.25 man-year x \$16,935

3.50 man-year x \$15,193

89 man-year x \$13,577

1.75 man-year x \$12,098

Overtime \$5,100

= \$1,302,358

(2) Out years

1 man-year x \$23,021

1 man-year x \$18,817

1 man-year x \$16,935

14 man-years x \$15,193

356 man-years x \$13,577

7 man-years x \$12,098

Overtime \$20,400

= \$5,209,973

b. Military Base Pay and Allowances.

Costs are based on 1 O-3, 1 E-4 and local E-6's performing as graders of SQT.

(1) Current FY -

.25 man-year x \$41,276

60 man-year x \$22,963

.25 man-year x \$16,577

= \$1,392,243

(2) Out years -

1 man-year x \$41,276

240 man-years x \$22,963

1 man-year x \$16,577

= \$5,568,972

c. Supplies.

Costs are based on \$124 per year for permanent and part time employees at ATSC and for costs of paper, printing, and template production to support manual local scoring.

(1) Current FY -

.25 x 30 x \$124

.25 x 100,000 x \$3.80

.25 x 15,000 x \$13

.25 x 352 x \$10

.25 x 352 x 30 x \$10

= \$171,960

(2) Out years -

30 x \$124

100,000 x \$3.80

15,000 x \$13

352 x \$10

352 x 30 x \$10

= \$687,840

d. Training.

\$110/month

= \$1,320

e. Other.

Printing \$22,000/year

Contracts \$ 4,500/year

Travel \$ 4,300/year

= \$40,800

4. OMIS/SMD civilian/military man-years are based on past and present workload experience.

TABLE 10

Part I ADP Expenses (\$000)	Office: OMIS Date: 31 Jan 81		Alternative: 3B Scoring (Less Local E6 Labor Opportunity Costs)									
	1Q										3Q	
	Current FY 81	82	83	84	85	86	87	88	89	90		
<b>In-house Personnel Resources</b>												
a. Civilian Man-Years	2.75	11	11	11	11	11	11	11	11	8.25		
Civilian End Strengths	11	11	11	11	11	11	11	11	11	11		
b. Military Man-Years	.5	2	2	2	2	2	2	2	2	1.5		
Military End Strengths	2	2	2	2	2	2	2	2	2	2		
<b>Capital Investments--Total</b>												
a. Purchase of New ADPE	N/A											
b. Purchase of Leased ADPE												
c. Purchase of Other Equipment												
d. Site Preparation												
<b>In-house Operations--Total</b>												
a. Civilian Salaries & Overtime	112.9	451.4	451.4	451.4	451.4	451.4	451.4	451.4	451.4	338.6		
b. Military Base Pay & Allowances	70.5	281.9	281.9	281.9	281.9	281.9	281.9	281.9	281.9	211.4		
c. Supplies	9.9	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	29.7		
d. Training	32.5	130	130	130	130	130	130	130	130	97.5		
e. Other												
<b>Commercial Contract Services--Total</b>												
a. Leased ADPE Rentals & Maintenance	65	274	274	274	274	134	134	134	134	100.5		
b. ADPE Time	65	274	274	274	274	134	134	134	134	100.5		
c. Systems Analysis & Programming												
d. Maintenance of Owned ADPE												
e. Other												
<b>Inter and Intra Agency Services</b>												
a. Payments to Others												
b. Reimbursement from Others												
Total Cost (NET)	177.9	725.4	725.4	725.4	725.4	585.4	585.4	585.4	585.4	439.1		
<b>Total Cost by Appropriation</b>												
MPA	9.9	39.5	39.5	39.5	39.5	39.5	39.5	39.5	39.5	29.7		
OMA	168	685.9	685.9	685.9	685.9	545.9	545.9	545.9	545.9	409.4		
OMAR												
OPA												
RDTE												
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.489	.445			
NET COST, DISCOUNTED:	169.7	628.9	571.6	520.1	473	346.6	315	286.3	195.4			
TOTAL COST DISCOUNTED:	3506.6											
UNIFORM ANNUAL COST:	438.3											

ALTERNATIVE 3B - MANUAL LOCAL SCORING  
(LESS LOCAL E6 LABOR OPPORTUNITY COSTS)

PART I

SAME AS ALTERNATIVE 1, PART I

TABLE 11

Part II Functional Expenses (\$000)	Office: FSD (SMD): TSO		Alternative: 3B						
	Date: 31 Jan 81		Manual Local Scoring (Without E6 Labor)						
	1Q		3Q						
	Current FY 81	82	83	84	85	86	87	88	89
In-house Personnel Resources									
a. Civilian Man-Years	95	380	380	380	380	380	380	380	285
Civilian End Strengths	377	377	377	377	377	377	377	377	377
b. Military Man-Years	.5	2	2	2	2	2	2	2	1.5
Military End Strengths	2	2	2	2	2	2	2	2	2
Capital Expenses--Total									
a. Equipment purchases									
b. Other capital expenses									
(Identify by EOE) equipment									
c. Total capital expenses									
In-house Operations--Total									
a. Civilian Salaries & Overtime	1302.4	5210.0	5210.2	5210.2	5210.2	5210.2	5210.2	5210.2	3907.5
b. Military Base Pay & Allowances	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
c. Supplies	172.0	687.8	687.8	687.8	687.8	687.8	687.8	687.8	515.9
d. Training	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
Total Cost	1496.9	5987.8	5987.8	5987.8	5987.8	5987.8	5987.8	5987.8	4490.9
Total Cost by Appropriation									
MPA	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
OMA	1482.4	5929.9	5929.9	5929.9	5929.9	5929.9	5929.5	5929.5	4447.5
OMAR									
OPA									
RDTE									
MCA									
OMANG									
CWRP									
AIF									
OTHER									
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.492	.445
NET COST, DISCOUNTED:	1428.0	5191.4	4717.8	4292.7	3903.5	3544.3	3221.0	2945.6	1998.5
TOTAL COST, DISCOUNTED:	*31242.8								
UNIFORM ANNUAL COST:	3905.3								

\*With template changes @ \$1337.6 annually  
total cost, discounted = \$39342

ALTERNATIVE 3B - MANUAL LOCAL SCORING  
(LESS LOCAL E6 LABOR OPPORTUNITY COSTS)

PART II  
FUNCTIONAL EXPENSES

1. IN-HOUSE PERSONNEL RESOURCES.

a. Civilian man-years.

(1) 377 personnel (training technicians, file clerks, receiving clerks and statistical assistants) x 160 hours per month x 12 months  
= 377 man-years

b. Military man-years.

2 personnel x 160 hours per month x 12 months  
= 2 man-years

2. CAPITAL EXPENSES.

N/A

3. IN-HOUSE OPERATIONS - TOTAL.

a. Civilian salaries and overtime.

Same as Alternative 3A.

b. Military base pay and allowances.

Cost based on 1 O-3 and 1 E-4 at FSD, SMD.

(1) Current FY -

.25 man-years x \$41,276

.25 man-years x \$16,577

= \$14,463

(2) Out years -

1 man-year x \$41,276

1 man-year x \$16,577

= \$57,852

c. Supplies.

Same as Alternative 3A.

Current FY - = \$171,960

Out Years - = \$687,840

d. Training (OMIS).

Same as Alternative 3A.

= \$1,320

e. Other.

Same As Alternative 3A.

= \$40,800

TABLE 12

Part I ADP Expenses (\$000)	Office: OMIS Date: 31 Jan 81		Alternative: 4A Regional - Purchase							
	1Q Current FY 81	82	83	84	85	86	87	88	3Q 89	
<b>In-house Personnel Resources</b>										
a. Civilian Man-Years	4.4	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	13.1
Civilian End Strengths	19	19	19	19	19	19	19	19	19	19
b. Military Man-Years	6	61	61	61	61	61	61	61	61	45.8
Military End Strengths	24	61	61	61	61	61	61	61	61	61
<b>Capital Investments--Total</b>										
a. Purchase of New ADPE	892.5	1381.8								
b. Purchase of Leased ADPE										
c. Purchase of Other Equipment										
d. Site Preparation										
<b>In-house Operations--Total</b>										
a. Civilian Salaries & Overtime	443.2	1747.4	1747.4	1747.4	1747.4	1747.4	1747.4	1747.4	1747.4	1253.4
b. Military Base Pay & Allowances	118.5	474.1	474.1	474.1	474.1	474.1	474.1	474.1	474.1	355.6
c. Supplies	266.8	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	800.3
d. Training	32.5	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	97.5
e. Other (TDY/Per Diem)	25.4	76.3								
<b>Commercial Contract Services--Total</b>										
a. Leased ADPE Rentals & Maintenance	53.9	298.6	298.6	298.6	298.6	210.8	210.8	210.8	210.8	158.1
b. ADPE Time	43.2	187.4	187.4	187.4	99.6	99.6	99.6	99.6	99.6	74.7
c. Systems Analysis & Programming										
d. Maintenance of Owned ADPE	10.7	111.2	111.2	111.2	111.2	111.2	111.2	111.2	111.2	83.4
e. Other										
<b>Inter and Intra Agency Services</b>										
a. Payments to Others										
b. Reimbursement from Others										
Total Cost (NET)	1389.6	3427.8	2046.0	2046.0	2046.0	1958.2	1958.2	1958.2	1958.2	1411.5
<b>Total Cost by Appropriation</b>										
MPA	266.8	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	1067.0	800.3
OMA	176.4	979.0	979.0	979.0	979.0	891.2	891.2	891.2	891.2	611.2
OMAR										
OPA	892.5	1381.8								
RDTE										
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.489	.445	
NET COST, DISCOUNTED:	1325.7	2971.2	1612.2	1467.0	1334.0	1159.3	1053.5	957.6	628.1	
TOTAL COST DISCOUNTED:	12508.6									
UNIFORM ANNUAL COST:	1563.6									

ALTERNATIVE 4A - REGIONAL (PURCHASE)  
PART I

1. IN-HOUSE PERSONNEL RESOURCES.

a. Civilian man-years.

(1) Software development and maintenance.

10 programmers x 160 hours per month x 12 months  
= 10 man-years

(2) Computer operations.

4 operators x 100 hours per month x 12 months  
= 2.5 man-years

5 operators x 160 hours per month x 12 months  
= 5 man-years

b. Military man-years.

(1) Software development and maintenance.

4 programmers x 160 hours per month x 12 months  
= 4 man-years

(2) Computer operations.

57 operators x 160 hours per month x 12 months  
= 57 man-years

2. CAPITAL INVESTMENT - TOTAL.

a. Purchase of new ADPE - Current FY.

(1) 22 NCS 7001 scanners x \$15,750  
(2) Upgrade 20 TMACS systems x \$900  
(3) 2 IBM 5120 computing systems x \$21,000  
(minus 2 x \$7,000 accrued residuals)  
(4) 2 IBM 4331 systems x \$250,000  
= \$892,500

b. Purchase of new ADPE by 82.

- (1) 38 NCS 7001 scanners x \$15,750
- (2) Upgrade 37 TMACS systems x \$900
- (3) 3 IBM 4334 systems x \$250,000

= \$1,381,800

3. IN-HOUSE OPERATIONS - TOTAL.

a. Civilian salaries and overtime.

Costs are based on 1 GS-13, 4 GS-12's, 3 GS-11's, 2 GS-9's, 3 GS-6's, and 6 GS-5's.

(1) Current FY -

- .25 man-year x \$39,694
- 1 man-year x \$33,380
- .75 man-year x \$27,853
- .50 man-year x \$23,021
- .75 man-year x \$16,935
- 1.5 man-years x \$15,193
- Overtime \$7,327

= \$118,522

(2) Out years -

- 1 man-year x \$39,694
- 4 man-years x \$33,380
- 3 man-years x \$27,853
- 2 man-years x \$23,021
- 3 man-years x \$16,935
- 6 man-years x \$15,193
- Overtime \$29,307

= \$474,085

b. Military base pay and allowances.

Costs are based on 1 O-5, 2 E-6's, and 58 E-4's.

(1) Current FY-

.25 man-year x \$59,641

.50 man-year x \$22,963

14.5 man-years x \$16,577

= \$266,759

(2) Out years -

1 man-year x \$59,641

2 man-years x \$22,963

58 man-years x \$16,577

= \$1,067,033

c. Supplies.

Operational supply costs are based on an average of .13 cents per soldier scored and include diskette costs for SQT scoring on TMACS ADPE.

(1) Current FY -

250,000 soldiers scored x \$.13

= \$32,500

(2) Out years -

1,000,000 soldiers x \$.13

= \$130,000

d. Other.

(1) Current FY -

Travel and per diem for system extension

= \$25,426

(2) Out years (FY 82 only)-

Travel and per diem for system extension

= \$76,349

4. COMMERCIAL CONTRACT SERVICES - TOTAL.

a. Leased ADPE Rentals and Maintenance.

All costs include maintenance. Individual items and cost per month are listed below:

Terminal w/keyboard \$140

90 CPS printer \$80

250 LPM printer \$466

MODEM \$1,000

Synch Data Set Connects \$83

B6810 Mainframe -

1st five years \$40,000 x 25%  
(SQT usage factor) \$10,000

2nd five years \$10,750 x 25%  
(SQT usage factor) \$2,688

(1) Current FY -

5 Terminals w/keyboard x \$420

3 Sets MODEM x \$3,000

3 Synch connects x \$249

1 250 LPM printer x \$1,398

1 B6810 Mainframe x \$30,000

= \$43,245

(2) Out years -

13 Terminals w/printer x \$1,680

3 Sets MODEM x \$12,000

3 Synch connects x \$996

1 90 CPS printer x \$960

1 250 LPM printer x \$5,592

1 B6810 Mainframe thru FY 85 x \$120,000

Per Year FY 82-85 = \$187,380

1 B6810 Mainframe FY 86-89 x \$32,256

Per Year FY 86-89 = \$99,636

b. Maintenance of owned ADPE.

(1) Current FY -

(a) 2 IBM 5120 computing systems x \$132 x 12 months x .25

(b) 22 NCS 7001 scanners x \$150 x 12 months x .25

(c) 2 IBM 4331 Systems x \$755 x 12 months x .25

= \$15,222

(2) Out years -

(a) 2 IBM 5120's x \$132 x 2 x 12 months

(b) 60 NCS 7001 Scanners x \$150 x 12 months

(c) 5 IBM 4331 Systems x \$755 x 12 months

= \$156,468

c. Other.

All communications costs are based on \$.57 per mile for leased lines and \$400 per satellite hour.

(1) Current FY -

(a) 20 IBM 5120's to IBM 4331's x \$.57 per mile x 418 miles x 12 months x \$.25

(b) 2 IBM 4331's to master x \$.57 per mile x 1,500 miles x 12 months x \$.25  
= \$19,426

(2) Out years -

(a) 57 IBM 5120's to IBM 4331's x \$.57 per mile x 418 miles x 12 months

(b) 2 IBM 4331's to master x \$.57 per mile x 1,500 miles x 12 months

(c) 3 IBM 4331's to master via satellite x \$400 per hour x 8 hours x 12 months

= \$298,690

TABLE 13

Part II Functional Expenses (\$000)	Office: FSD, SMD Date: 31 Jan 81		Alternative: 4A Regional - Purchase						
	Current FY 81	82	83	84	85	86	87	88	89
<b>In-house Personnel Resources</b>									
a. Civilian Man-Years	5	20	20	20	20	20	20	20	15
Civilian End Strengths	20	20	20	20	20	20	20	20	20
b. Military Man-Years	.5	2	2	2	2	2	2	2	1.5
Military End Strengths	2	2	2	2	2	2	2	2	2
<b>Capital Expenses--Total</b>									
a. Equipment purchases									
b. Other capital expenses									
(Identify by EOE) equipment	N/A								
c. Total capital expenses									
<b>In-house Operations--Total</b>	166.4	665.6	665.6	665.6	665.6	665.6	665.6	665.6	665.6
a. Civilian Salaries & Overtime	82	328	328	328	328	328	328	328	246
b. Military Base Pay & Allowances	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
c. Supplies	61.9	247.6	247.6	247.6	247.6	247.6	247.6	247.6	183.7
d. Training	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
<b>Total Cost</b>	166.4	665.6	665.6	665.6	665.6	665.6	665.6	665.6	499.2
<b>Total Cost by Appropriation</b>									
MPA	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
OMA	151.9	607.7	607.7	607.7	607.7	607.7	607.7	607.7	455.8
OMAR									
OPA									
RDTE									
MCA									
OMANG									
CWRF									
AIF									
OTHER									
<b>DISCOUNT FACTOR:</b>	.954	.867	.788	.717	.652	.592	.538	.489	.445
<b>NET COST, DISCOUNTED:</b>	158.7	577.1	524.5	477.2	434.0	394.0	358.1	325.5	222
<b>TOTAL COST, DISCOUNTED:</b>	3471.2								
<b>UNIFORM ANNUAL COST:</b>	433.9								

ALTERNATIVE 4A - REGIONAL

PART II

1. IN-HOUSE PERSONNEL RESOURCES.

a. Civilian man-years.

20 personnel (training technicians, file clerks, and statistical assistants) x 160 hours per month x 12 months

= 20 man-years

b. Military man-years.

2 personnel x 160 hours per month x 12 months

= 2 man-years

2. CAPITAL EXPENSES - TOTAL.

N/A.

3. IN-HOUSE OPERATIONS - TOTAL.

a. Civilian salaries and overtime.

Costs are based on 1 GS-9, 1 GS-7, 1 GS-6, 13 GS-5's, 2 GS-4's and 2 GS-3's.

(1) Current FY -

.25 man-year x \$23,021

.25 man-year x \$18,817

.25 man-year x \$16,935

3.25 man-years x \$15,193

.50 man-years x \$13,577

.50 man-years x \$12,098

Overtime \$5,100

= \$82,008

(2) Out years -

1 man-year x \$23,021  
1 man-year x \$18,817  
1 man-year x \$16,935  
13 man years x \$15,193  
2 man-years x \$13,577  
2 man-years x \$12,098  
Overtime \$20,400

= \$328,032

b. Military Base Pay and Allowances.

Costs are based on 1 O-3 and 1 E-4.

(1) Current FY -

.25 man-year x \$41,276  
.25 man-year x \$16,577

= \$14,463

(2) Out years -

1 man-year x \$41,276  
1 man-year x \$16,577

= \$57,853

c. Supplies.

(1) Current FY -

.25 x 30 people x \$124  
.25 x 10,000 templates x \$3.80  
.25 x 15,000 pages x \$13/1,000 pages  
.10 x .25 x 352 TSO x \$10 per score chart  
.10 x .25 x 352 TSO x 30 x \$10/1000 pages

= \$61,908

(2) Out years -

30 people x \$124

10,000 templates x \$3.80

15,000 pages x \$13/1,000 pages

.10 x 352 TSO x \$10 per TSO

.10 x 352 x 30 x 10/1,000 pages

= \$247,632

d. Training.

\$110 per month

= \$1,320

e. Other.

Printing \$22,000 per year

Contracts \$ 4,500 per year

Travel \$ 4,300 per year

= \$30,800

4. Civilian and military man-years are based upon past and present workload experience.

TABLE 14

Part I ADP Expenses (\$000)	Office: OMIS/SMD		Alternative: 4B							
	Date: 31 Jan 81		Regional - Lease							
	1Q									
	Current FY 81	82	83	84	85	86	87	88	89	90
In-house Personnel Resources										
a. Civilian Man-Years	4.4	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	13.1
Civilian End Strengths	19	19	19	19	19	19	19	19	19	19
b. Military Man-Years	6	61	61	61	61	61	61	61	61	45.8
Military End Strengths	24	61	61	61	61	61	61	61	61	61
Capital Investments--Total										
a. Purchase of New ADPE	46	33.3								
b. Purchase of Leased ADPE										
c. Purchase of Other Equipment										
d. Site Preparation										
In-house Operations--Total	443.9	1747.3	1671	1671	1671	1671	1671	1671	1671	1253.3
a. Civilian Salaries & Overtime	119	474	474	474	474	474	474	474	474	355.5
b. Military Base Pay & Allowances	267	1067	1067	1067	1067	1067	1067	1067	1067	800
c. Supplies	32.5	130	130	130	130	130	130	130	130	97.5
d. Training										
e. Other (TDY/Per Diem)	25.4	76.3								
Commercial Contract Services--Total	148.6	1388.1	1388.1	1388.1	1388.1	1300.3				975.2
a. Leased ADPE Rentals & Maintenance	128.4	1086.2	1086.2	1086.2	1086.2	998.4	998.4	998.4	998.4	748.8
b. ADPE Time										
c. Systems Analysis & Programming	.8	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	2.4
d. Maintenance of Owned ADPE										
e. Other (Communications)	19.4	298.7	298.7	298.7	298.7	298.7	298.7	298.7	298.7	224
Inter and Intra Agency Services										
a. Payments to Others										
b. Reimbursement from Others										
Total Cost (NET)	592.5	3135.4	2059.1	3059.1	3059.1	2971.3	2971.3	2971.3	2971.3	2228.5
Total Cost by Appropriation										
MPA										
OMA	267	1067	1067	1067	1067	1067	1067	1067	1067	800
OMAR	279.5	2035.1	1992.1	1992.1	1992.1	1992.1	1992.1	1904.3	1904.3	1428.5
OPA	46	33.3								
RDTE	.954	.867	.788	.717	.652	.592	.538	.489	.445	
DISCOUNT FACTOR:	565.2	2718.4	2410.6	2193.4	1994.5	1759	1598.6	1453	991.7	
NET COST, DISCOUNTED:	15684.4									
TOTAL COST DISCOUNTED:	1960.6									
UNIFORM ANNUAL COST:										

ALTERNATIVE 4B - REGIONAL - LEASE

PART I

1. IN-HOUSE PERSONNEL RESOURCES.

Same as Part I, Alternative 4A.

(Civilian = 17.5 man-years

Military = 61 man-years)

2. CAPITAL INVESTMENT - TOTAL.

a. Purchase of new ADPE - Current FY.

(1) Upgrade 20 TMACS Systems x \$900

(2) 2 IBM 5120 Computing Systems x \$21,000 (minus 2 x \$7000  
accrued residuals)

= \$46,000

b. Purchase of new ADPE FY 82.

Upgrade 37 TMACS systems x \$900

= \$33,300

3. IN-HOUSE OPERATIONS - TOTAL.

Same as Part I, Alternative 4A.

Civilian:

Current FY - = \$118,522

Out Years - = \$474,085

Military:

Current FY - = \$266,759

Out Years - = \$1,067,033

Supplies:

Current FY - = \$32,500

Out Years - = \$130,000

Other:

Current FY -	= \$25,426
Out Years FY 82 Only -	= \$76,349

4. COMMERCIAL CONTRACT SERVICES - TOTAL.

a. Leased ADPE Rentals and Maintenance.

All costs include maintenance. Individual items and cost per month are listed below:

Terminal w/keyboard \$140

90 CPS printer \$80

250 LPM printer \$466

MODEM \$1,000

Synch Data Set Connects \$83

B6810 Mainframe -

1st five years \$40,000 x 25%

(SQT usage factor) \$10,000

2nd five years \$10,750 x 25%

(SQT usage factor) \$2,688

NCS 7001 Scanner \$790

IBM 4331 System \$5,500

(1) Current FY -

5 Terminals w/keyboard x \$420

3 Sets MODEM x \$3,000

3 Synch connects x \$249

1 250 LPM printer x \$1,398

22 NCS 7001 scanners x \$ 2,370  
 2 IBM 4331 systems x \$16,500  
 1 B6810 Mainframe x \$30,000  
 = \$128,385

(2) Out years -

13 Terminals w/printer x \$1,680  
 3 Sets MODEM x \$12,000  
 3 Synch Connects x \$996  
 1 90 CPS printer x \$960  
 1 250 LPM printer x \$5,592  
 60 NCS 7001 scanners x \$9,480  
 5 IBM 4331 Systems x \$66,000  
 1 B6810 Mainframe thru FY 85 x \$120,000  
 Per Year FY 82-85 = \$1,086,180

1 B6810 Mainframe FY 86-89 x \$32,256  
 PER Year FY 86-89 = \$998,436

b. Maintenance of owned ADPE.

(1) Current FY -

2 IBM 5120 Computing Systems x \$132 x 12 months x .25  
 = \$792

(2) Out Years -

2 IBM 5120 Computing Systems x \$132 x 12 months  
 = \$3,168

c. Other (Communications).

Same as Alternative 4A, Part I.

(1) Current FY - = \$19,426

(2) Out years - = \$298,690

TABLE 15

Part II Functional Expenses (\$000)	Office: OMIS/SMD		Alternative: 4B							
	Date: 31 Jan 81		Regional - Lease							
	1Q									
	Current FY 81	82	83	84	85	86	87	88	89	90
In-house Personnel Resources										
a. Civilian Man-Years	5	20	20	20	20	20	20	20	20	15
Civilian End Strengths	20	20	20	20	20	20	20	20	20	20
b. Military Man-Years	.5	2	2	2	2	2	2	2	2	1.5
Military End Strengths	2	2	2	2	2	2	2	2	2	2
Capital Expenses--Total										
a. Equipment purchases										
b. Other capital expenses N/A (Identify by EOE) equipment										
c. Total capital expenses										
In-house Operations--Total	166.4	665.6	665.6	665.6	665.6	665.6	665.6	665.6	665.6	499.2
a. Civilian Salaries & Overtime	82	328	328	328	328	328	328	328	328	246
b. Military Base Pay & Allowances	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
c. Supplies	61.9	247.6	247.6	247.6	247.6	247.6	247.6	247.6	247.6	185.7
d. Training	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.0
e. Other	7.7	30.8	30.8	30.8	30.8	30.8	30.8	30.8	30.8	23.1
Total Cost	166.4	665.6	665.6	665.6	665.6	665.6	665.6	665.6	665.6	499.2
Total Cost by Appropriation										
MPA	14.5	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	43.4
OMA	151.9	607.7	607.7	607.7	607.7	607.7	607.7	607.7	607.7	455.8
OMAR										
OPA										
RDTE										
MCA										
OMANG										
CWRF										
AIF										
OTHER										
DISCOUNT FACTOR:	.954	.867	.788	.717	.652	.592	.538	.489	.445	
NET COST, DISCOUNTED:	158.7	577.1	524.5	477.2	434.0	394.0	358.1	325.5	222	
TOTAL COST, DISCOUNTED:	3471.2									
UNIFORM ANNUAL COST:	433.9									

ALTERNATIVE - 4B

REGIONAL - LEASE

PART II

SAME AS ALTERNATIVE 4A - PART II

## XI. BENEFITS.

1. An SQT Scoring and Feedback System that provides for accomplishment of the objectives listed below will alleviate the most common complaints and grievances with the current SQT system:

a. Provide the individual soldier with accurate SQT feedback in a useful form and in a manner timely enough to be of maximum benefit in the correction of identified weaknesses in individual skills.

b. Provide the supervisor and trainer/training manager with accurate SQT feedback which is in a useable form and is timely enough to be used in preparing training plans to correct identified weaknesses in individual skills.

c. Provide for mark-sense form error resolution at the source of the errors.

2. An SQT Scoring and Feedback System that will accomplish these objectives will improve the Army's readiness posture through more effective and timely management of training. FORSCOM alone expends approximately 350 million dollars annually for readiness training. Although it is difficult to quantify SQT benefits, it is easy to recognize that even small increases in efficiency provide substantial payoffs. The discussion of alternate benefits will focus on their ability to accomplish the objectives in 1, above.

3. Alternative 1, Centralized Scoring, is a four year old system. It has been able to partially accomplish objectives 1a and b (format). It has not been able to accomplish objective 1c. Its major benefits are the ease of management of a central system and avoidance of further capital expenditures for ADPE and related requirements.

4. Alternative 2, Automated Local Scoring, is able to partially meet objectives 1a and b (timeliness and format). It partially satisfies objective 1c by insuring 52% of mark-sense form error resolution is accomplished at the source of the errors. Data gathered during the field evaluations (see Incl 1) indicates greater satisfaction of both soldiers and commanders with the achieved feedback times and format. This alternative is dependent upon a reduced version of Alternative 1, Centralized Scoring, remaining in place.

5. Alternative 3, Manual Local Scoring, is the most costly in terms of dollars and manpower. It partially meets objective 1a (timeliness), but cannot accomplish objective 1b or c. The training manager must manually keep track of individual performance to identify common deficiencies within an MOS and skill level until summary data is received from the central system. Alternative 1, Centralized Scoring, remains intact under this alternative.

6. Alternative 4, Regional Local Scoring, combines the major benefits of the other alternatives. This alternative was conceptualized during the field evaluations when the problems identified and discussed in Section IX were recognized. Alternative 4 is not so decentralized as to become unmanageable because of template changes. On the contrary, electronic data links using state of the art technology allow interactive systems that minimize disruptions from template changes. The addition of the interactive capability makes this alternative far more desirable and responsive to the functional user. This alternative is dependent upon a significantly reduced version of Alternative 1, Centralized Scoring, remaining in place. Alternative 4 accomplishes all objectives.

## XII. COMPARISON OF ALTERNATIVES.

1. The alternatives in this economic analysis are compared based on (a) cost; (b) speed of feedback for the individual; (c) effectiveness of feedback for commanders; (d) resolution of mark-sense form errors at the source of the error; and (e) manpower (change) required to operate the system. Additive weighting technique is used to insure that where the parameter described is more important, an appropriate weight is assigned. To insure a commonality of measure, each alternative is placed on a scale of 0 to 100, where the larger value designates the preferred alternative. See Table 18 for formula. Table 20 shows the final comparisons.

2. Dollar Cost Comparison. The total dollar cost for each alternative was discounted at 10 per cent over an eight year life cycle. Cost data is summarized in Table 17. On a scale of 0 to 100, the least expensive is assigned a value of 100, the most a value of 0. Following is a ranking of alternatives with time and scalar values. (In parenthesis are the costs and scalar values computed for each alternative if the cost of template changes are included.)

<u>Alternate</u>	<u>Cost (\$000)</u>	<u>Scalar Value</u>
1	6,242.1	100
2B	11,159.4 (11,490.8)	92 (92)
2A	12,246.8 (12,578.2)	90 (90)
4A	15,979.8	83 (85)
4B	19,155.6	78 (80)
3B	34,749.4 (42,848.6)	51 (45)
3A	64,582.1 (72,681.3)	0 (0)

3. Speed of Individual Feedback. During the Field Evaluation of Automated Local Scoring (ALT 2), data were captured which allowed measurement of the time in days from SQT until the same test was scored, (see Table 19). The same mark-sense forms were tracked in the central system (ALT 1) and the same measurement conducted. Alternative 4 will approximate Alternative 2 and the same values are used. Alternative 3 provides the most rapid feedback and is assigned a value of 100 on the scale of 0 to 100. Distribution of the ISR is the same for all alternatives, i.e., each alternative returns the ISR to the test site from where local distribution thru channels is made. This time is, therefore, not considered. Following is the ranking of all alternatives with time and scalar values.

<u>Alternative</u>	<u># Days</u>	<u>Scalar Value</u>
3A	1	100
3B	1	100
2A	8	87
2B	8	87
4A	8	87
4B	8	87
1	56	0

4. Effectiveness of Feedback for Commanders. Responses of commanders during the field evaluation of Alternative 2 shows that the effectiveness of unit summaries is dependent upon two factors: speed of feedback and the certainty that all of a specific MOS is reflected in the summary data (see Incl 1). Alternatives 2 and 4 provide the capability of specifying MOS, unit, or time period to be summarized and will return the summary within 7 days. The system objectives for Alternatives 1 and 3 are to issue the various summaries on a 60 to 120 day cycle, regardless of MOS groupings. Given the time from SQT til scoring (Table 19) for these alternatives, since summary cannot be produced until SQT are scored, Alternatives 2 and 4 are most effective. As a matter of note, the Central System (ALT 1) published only one SQT II unit level summary during all of calendar year 1980. Following are rankings of alternatives with scalar values.

<u>Alternatives</u>	<u>Scalar Value</u>
2A	100
2B	100
4A	100
4B	100
1	0
3A	0
3B	0

5. Error Resolution at Error Source. Errors in coded entries on the mark sense form have a degrading effect on both feedback time and effectiveness. Any single error not detected and corrected at the test site may cause a delay in processing of from 1 to 30 days (ALT 1 & 3). Resolution of these errors at the source (test site) yields significant benefits. A total of 46 separate errors may occur on the form. Following are rankings of alternatives showing the percentage of errors that each can resolve at the source of the error and scalar value. Alternative 1 (and 3) currently experience 60% of all forms containing some error.

<u>Alternative</u>	<u>% Errors at Source</u>	<u>Scalar Value</u>
4A	100	100
4B	100	100
2A	52	52
2B	52	52
1	0	0
3A	0	0
3B	0	0

6. Changes in Required Manpower. A system which requires additional authorized military and/or civilian manpower requires consideration for other than dollar costs. Under current manpower constraints, even if dollars were available, requirements to find faces for spaces severely handicaps fielding a system causing the unfilled spaces to be absorbed by

agencies and detracting from the ability to perform the mission for which the "borrowed" personnel are originally intended. Following are rankings of alternatives showing changes in manpower required for the 8 year life cycle.

<u>Alternative</u>	<u>Manpower</u>	<u>Scalar Value</u>
1	+0	100
2A	+53	85
2B	+53	85
4A	+62	83
4B	+62	83
3B	+350	0
3A	+350	0

7. Weighting Factors In using the additive weighting technique for ranking alternatives, it is necessary to examine the attributes used to compare alternatives and assign a weight factor to each. Examination of the five attributes reveals that better performance by any alternative in error resolution has a positive effect on both ISR feedback speed and Summary Report effectiveness. Error resolution is therefore deemed the most beneficial attribute and is more heavily weighted. Cost is considered the least weighted attribute provided others are met. ISR and summary feedback attributes are equally weighted between error resolution and cost (equally weighted with manpower). Following is the attribute weighting scale used in this analysis and corresponding weighting factors.

TABLE 16 - WEIGHTING FACTORS

<u>ATTRIBUTE</u>	<u>WEIGHT SCALE</u>	<u>WEIGHTING FACTOR</u>
Error Resolution	2	.28
Speed	1.5	.22
Summary Effectiveness	1.5	.22
Manpower	1.0	.14
Cost	1.0	.14
		<hr/>
		1.0

TABLE 17  
DOLLAR COST COMPARISON (\$000)

YEAR	DISCOUNT FACTOR	ALT 1		ALT 2A		ALT 2B	
		CURRS	DISCS	CURRS	DISCS	CURRS	DISCS
1 (1Q)	.954	309.0	294.8	896.9	854.9	442.9	422.5
2	.867	1,249.9	1,083.6	3,095.8	2,684.1	2,734.1	1,270.5
3	.788	1,249.9	984.9	2,197.0	1,731.3	2,657.8	2,094.4
4	.717	1,249.9	896.2	2,197.0	1,575.3	1,657.8	1,905.7
5	.652	1,249.9	815.0	2,197.0	1,432.5	2,657.8	1,732.9
6	.592	1,109.9	657.1	2,109.2	1,247.7	2,537.8	1,502.4
7	.538	1,109.9	597.2	2,109.2	1,134.7	2,537.8	1,365.3
8	.489	1,109.9	542.8	2,109.2	1,031.4	2,537.8	1,241.0
9 (3Q)	.445	832.5	370.5	1,581.7	703.8	1,903.2	846.9
TOTAL		9,470.8	6,242.1	18,492.3	12,246.8	20,687.7	11,159.4
					*12,578.2	11,490.8	

\*Cost changes to reflect required template changes

TABLE 17 (Cont.)  
DOLLAR COST COMPARISON (\$000)

YEAR	DISCOUNT FACTOR	ALT 3A		ALT 3B		ALT 4A		ALT 4B	
		CURRS	DISCS	CURRS	DISCS	CURRS	DISCS	CURRS	DISCS
1 (1Q)	.954	3,052.5	2,912.1	1,674.8	1,597.7	1,556	1,484.4	758.9	724.0
2	.867	12,223.8	10,598.0	6,713.2	5,820.3	4,093.5	3,548.3	3,801.0	3,295.5
3	.788	12,223.8	9,632.3	6,713.2	5,289.4	2,711.6	2,136.7	3,724.7	2,935.1
4	.717	12,223.8	8,764.5	6,713.2	4,812.8	2,711.6	1,944.2	3,724.7	2,670.6
5	.652	12,223.8	7,770.0	6,713.2	4,376.5	2,711.6	1,768.0	3,724.7	2,428.5
6	.592	12,083.8	7,153.7	6,573.2	3,890.9	1,626.8	1,553.3	3,636.9	2,153.0
7	.538	12,083.8	6,501.0	6,573.2	3,536.0	2,626.8	1,411.6	3,636.9	1,956.7
8	.489	12,083.8	5,938.3	6,573.2	3,231.9	2,626.8	1,283.1	6,636.9	1,778.4
9 (3Q)	.445	9,062.6	5,312.2	4,930.0	2,193.9	1,910.7	849.2	2,677.7	1,191.6
TOTAL		97,261.7	64,582.1	53,177.2	34,749.4	23,575.4	15,979.8	29,322.4	19,155.6
			*72,681.0	*42,848.6					

\*Cost changes to reflect required template changes

TABLE 18 - SCALING FORMULA

A = Value of Alternative

A min = Minimum Value of All Alternatives

A max = Maximum Value of All Alternatives

X = Scaled Value

S max = Maximum Scale Value

S min = Minimum Scale Value

1. For Negative Slope (e.g., cost, # days):

$$(A - A_{\min} / A_{\max} - A_{\min}) (S_{\min} - S_{\max}) + S_{\max}$$

2. For Positive Slope (e.g., % Error Resolution)

$$(A - A_{\min} / A_{\max} - A_{\min}) (S_{\max} - S_{\min}) + S_{\min}$$

TABLE 19 - TIME FROM TEST TO SCORE

AUTOMATED LOCAL SCORING (ALT 2)

<u>TSO</u>	<u># DAYS (TEST-SCORE)</u>	<u># COMPARED*</u>	<u>TOT DAYS</u>
161	4	2690	10760
525	9	775	6975
533	6	579	3474
543	17	1233	20961
576	10	416	4160
		5693	46330

$$\frac{\text{TOT DAYS}}{\text{\# COMPARED}} = 8.14 \text{ (AVG TIME/SQT-SCORED)}$$

CENTRAL SCORING SYSTEM (ALT 1)

<u>TSO</u>	<u># DAYS</u>	<u># COMPARED*</u>	<u>TOT DAYS</u>
161	62	2690	166780
525	44	775	34100
533	52	579	30108
543	42	1233	51786
576	86	416	35776
		5693	318,550

$$\frac{\text{TOT DAYS}}{\text{\# COMPARED}} = 55.95 \text{ (AVG TIME/SQT SCORED)}$$

\*Number compared is total SQT's tracked thru both systems during the period of the field evaluation of the automated local system (See Para XII-3).

TABLE 20 - COMPARISON OF ALTERNATIVES  
(WEIGHTED - NO TEMPLATE CHANGES)

ALTERNATIVE (ALT)

	1	2A	2B	3A	3B	4A	4B	
ERROR RESOLUTION	0	52	52	0	0	100	100	.28
INDIV FEEDBACK SPEED	0	87	87	100	100	87	87	.22
WEIGHTING FACTOR (WF)								
ATTRIBUTE (ATT)								
SUMMARY REPORT EFFECTIVENESS	0	100	100	0	0	100	100	.22
ADDITIONAL MANPOWER	100	85	85	0	0	83	83	.14
COST	100	90	92	0	51	83	78	.14
	28	80.2	80.5	22	29.2	92.4	91.7	

WEIGHT SUM

$$\text{Weighted sum} = \sum_{i=1}^5 (\text{ALT SCALED VALUE}_i) (\text{ATTRIBUTE WF}_i)$$

TABLE 21 - COMPARISON OF ALTERNATIVES  
(WEIGHTED - WITH TEMPLATE CHANGES)

ALTERNATIVE (AL<sub>i</sub>)

	1	2A	2B	3A	3B	4A	4B
ERROR RESOLUTION	0	52	52	0	0	100	100
INDIV FEEDBACK SPEED	0	87	87	100	100	87	87
SUMMARY REPORT EFFECTIVENESS	0	100	100	0	0	100	100
ADDITIONAL MANPOWER	100	85	85	0	0	83	83
COST	100	90	92	0	45	85	80
	28	80.2	80.5	22	28.3	92.6	92.0

WEIGHTING FACTORS (WF)

WEIGHTED SUM

$$\text{Weighted Sum} = \sum_{i=1}^5 (\text{ALT SCALED VALUE}_i) (\text{ATTRIBUTE WF}_i)$$

TABLE 22 - COMPARISON OF ALTERNATIVES  
(UNWEIGHTED-NO TEMPLATE CHANGES)

ALTERNATIVE (ALT)

	1	2A	2B	3A	3B	4A	4B
ERROR RESOLUTION	0	52	52	0	0	100	100
INDIVIDUAL FEEDBACK	0	87	87	100	100	87	87
SUMMARY REPORT EFFECTIVENESS	0	100	100	0	0	100	100
ADDITIONAL MANPOWER	100	85	85	0	0	83	83
COST	100	90	92	0	51	83	78
	200	414	416	100	151	453	448

UNWEIGHTED SUM



XIII. CONCLUSIONS AND RECOMMENDATIONS.

Based on the preceding analysis the following conclusions and recommendations are presented:

1. Conclusions.

a. No template Changes.

(1) If the system to be implemented makes template changes once annually, not placing into effect the frequent changes mandated by the various schools, the preferred alternative is as shown below in the ranked list. Listing is in order from most preferred to least preferred, shown with weighted sums.

<u>ALTERNATIVE</u>	<u>WEIGHTED SUM</u>
4A (Regional, purchase)	92.4
4B (Regional, Lease)	91.7
2B (Automated Local, Lease)	80.5
2A (Automated Local, Purchase)	80.2
3B (Manual, less E6)	29.2
1 (Central System)	28.0
3A (Manual, Local, with E6)	22.0

(2) Should the decision maker prefer (or believe) that the attributes of the systems should be weighted equally, then the following ranking shows the order of preference of the alternatives considered.

<u>ALTERNATIVE</u>	<u>UNWEIGHTED VALUE</u>
4A (Regional, Purchase)	453
4B (Regional, Lease)	448
2B (Automated Local, Lease)	416
2A (Automated Local, Purchase)	414
1 (Central System)	200
3B (Manual, Local, without E6)	151
3A (Manual, Local, with E6)	100

b. With template changes.

(1) If the system is required to implement template changes as they occur, the obvious tangible differences are in costs for Alternatives 2 and 3 (with contingencies). Shown below is a ranking of alternatives from most preferred to least preferred with weighted values.

<u>ALTERNATIVE</u>	<u>WEIGHTED VALUE</u>
4A (Regional, purchase)	92.6
4B (Regional, lease)	92.0
2B (Automated local, lease)	80.5
2A (Automated local, purchase)	80.2
3B (Manual local, less E6)	28.3
1 (Central System)	28
3A (Manual local, with E6)	22

(2) If the decision maker considers the attributes used in the analysis as equally weighted, the ranking of the alternatives is as shown below, with unweighted benefit values.

<u>ALTERNATIVE</u>	<u>WEIGHTED VALUE</u>
4A (Regional, purchase)	455
4B (Regional, lease)	450
2B (Automated local, lease)	416
2A (Automated local, purchase)	414
1 (Central System)	200
3B (Manual local, less E6)	145
3A (Manual local, with E6)	100

c. Discussion.

(1) A system that cannot respond to template changes by implementing them in a timely and controlled manner will not meet the realized requirements of SQT. Developing and fielding a valid test of the skills and knowledge of a soldier is a time consuming process. Some changes will inevitably be required because of weapon system or doctrine changes. Currently, a conservative estimate by the SQT Management Division, ATSC, holds that 50% of all templates are changed prior to the end of the valid test period.

(2) Results of SQT are used both in enlisted personnel management (promotion, assignment) and training management. If initial feedback from the SQT is in error because of an erroneous template, it is imperative to issue correct results as rapidly as possible.

(3) Changing of templates during a test period has intangible effects that cannot be expressed or quantified as dollars or benefits. For both alternatives 3A and 3B, the ability to manually grade the SQT is irretrievably lost when the mark-sense form is mailed to ATSC. The soldier's official results are returned to him sixty odd days later. Significant cost increases are encountered for these alternatives when such changes are made. In addition, difficulties will be encountered in filing and accounting for the correct templates with the volume of anticipated changes.

(4) Alternatives 2A and 2B would have template changes effected by the mailing of new diskettes to each of the 57 local computers. Corrected official results would then be obtained by rescoring all affected tests. With the volume of changes anticipated, the already degraded TMACS application would suffer further degradation. No adequate method is known that would insure the corrected templates were ever emplaced or that the SQT were in fact regraded.

(5) Alternatives 4A and 4B, as conceptualized, are least affected by the requirement to change templates. Changes would be transmitted from the master computer to regional computers electronically, insuring that all changes did go into effect at the same time. Regrading and reissue of feedback would be automatic when template changes were received. While the template changes add significantly to the costs of Alternatives 2 and 3, such is not the case with Alternative 4.

(6) As noted in 1a and 1b above, Alternative 4A is clearly the preferred alternative regardless of weighting or if template changes are considered or not. Only if cost is weighted as the most important attribute will alternative 2B become the preferred alternative.

2. Recommendations.

a. Since alternative 4A is conceptual only, recommend it be operationally tested as soon as possible to confirm or refute the attributes and benefits shown in this analysis and to establish firm cost and functional capabilities.

b. Recommend the review of this analysis following such testing to reconfirm findings of preference for that alternative.

EXTRACT OF REPORT

SQT AUTOMATED LOCAL SCORING

A. A field evaluation of automated local scoring using scanners and minicomputers was conducted from 15 July to 30 November 1980. Two sites were involved: (1) TSO 161, 82d ABN Div, Ft Bragg, NC; (2) TSO 481, 525, 533, 543, 576 (controlled by TSO 533), 1st AD, USAREUR.

B. Following information is extracted from draft ATB Evaluation Report. All data is final and will not differ from the final report unless so noted.

C. Machine Scoring Data. Table 24 shows data for machine scoring and ISR print cycles at each field site.

1. The USAREUR site had an older generation of ADPE and software, recognizably slower in processing and print times.

2. Data are for periods 15 July - 24 November at Ft Bragg and 21 July - 21 November in USAREUR.

3. All times are in hours or fractions of hours.

MACHINE SCORING DATA

Test Site	Total Scored	Avg # Per Cycle	Avg Cycle Time	Avg % Errors/Scanner	% Errors/ Cycle Mach Edit Program	Avg ISR Print Time Per Cycle	Avg Templates/Cycle
USAREUR	5204	61	6.3	3.8	8.3 4.9	2.23	11.3
Ft Bragg	4033	54	4.3	2.7	9.8 4.1	1.45	9.9

TABLE 24

D. Distribution of Individual Soldiers Reports (ISR). Table 25 summarizes statistical data observed and calculated for distribution of ISR to soldiers tested and scored by the local ADPE.

INCL 1

1. ISR were distributed using existing channels and normal processes within unit(s) concerned.

2. An overprinted Form 2496 (DF) was attached to every tenth ISR produced. The DF requested the supervisor of the soldier concerned to fill in the date the ISR was delivered to the soldier and return the DF to the TSO.

3. Delays in distribution caused by major field exercises (e.g., REFORGER) or other contingencies (e.g., Cuban Refugee Resettlement) were left entirely to chance. Any effect is included in values shown in the table.

4. Geographics and necessary mail lag had a noticeable effect of distribution in USAREUR. Outlying TSO's (not collocated at the computer site) tended to batch mark-sense forms prior to forwarding to the computer, delaying distribution time from 3 to 14 days for any cycle. Data for TSO 533 (Ansbach, FRG) is not included in the USAREUR tabulation. That data approximated those from Ft Bragg (expected, since TSO 533 was collocated with the computer).

5. Distribution time shown is measured from the date of testing until date the tested soldier received the ISR, measured in days.

#### ISR DISTRIBUTION

Test Site	Total Samples	Avg Dist Time	Std Dev	Median	Mode	Range LO HI
Ft Bragg	133	9.4	8.05	6	6	1 58
USAREUR	183	17.05	12.05	17	6	1 55

TABLE 25

E. 984 soldiers were surveyed by questionnaire to determine if the time of distribution of the ISR had any effect on its usefulness to the soldier. 966 replied.

1. ISR were distributed in three control groups (a) as rapidly as possible; (b) delayed for 15 days; (c) delayed for 30 days. This was done to insure that there would, in fact, be a time differential to analyze.

2. The following question was asked of each soldier:

Q: How useful to you is this ISR in improvement of your military skills?

Possible Responses:

- |                     |                      |
|---------------------|----------------------|
| A - Very useful     | D - Not very useful  |
| B - Useful          | E - In no way useful |
| C - Slightly useful |                      |

3. The responses were weighted from 5 (Very useful) to 1 (In no way useful).

4. Responses were grouped according to time between test date and ISR delivery date. Several treatments were examined. Results are shown in Graph 1.

5. An analysis of variance revealed that there is a significant difference in the responses to the question when time to deliver the ISR is considered. The detected differences were significant to the 95% level of confidence.

F. Training Managers were surveyed to determine if the value of unit summary reports for planning training decays over time. Each was asked to respond to the following:

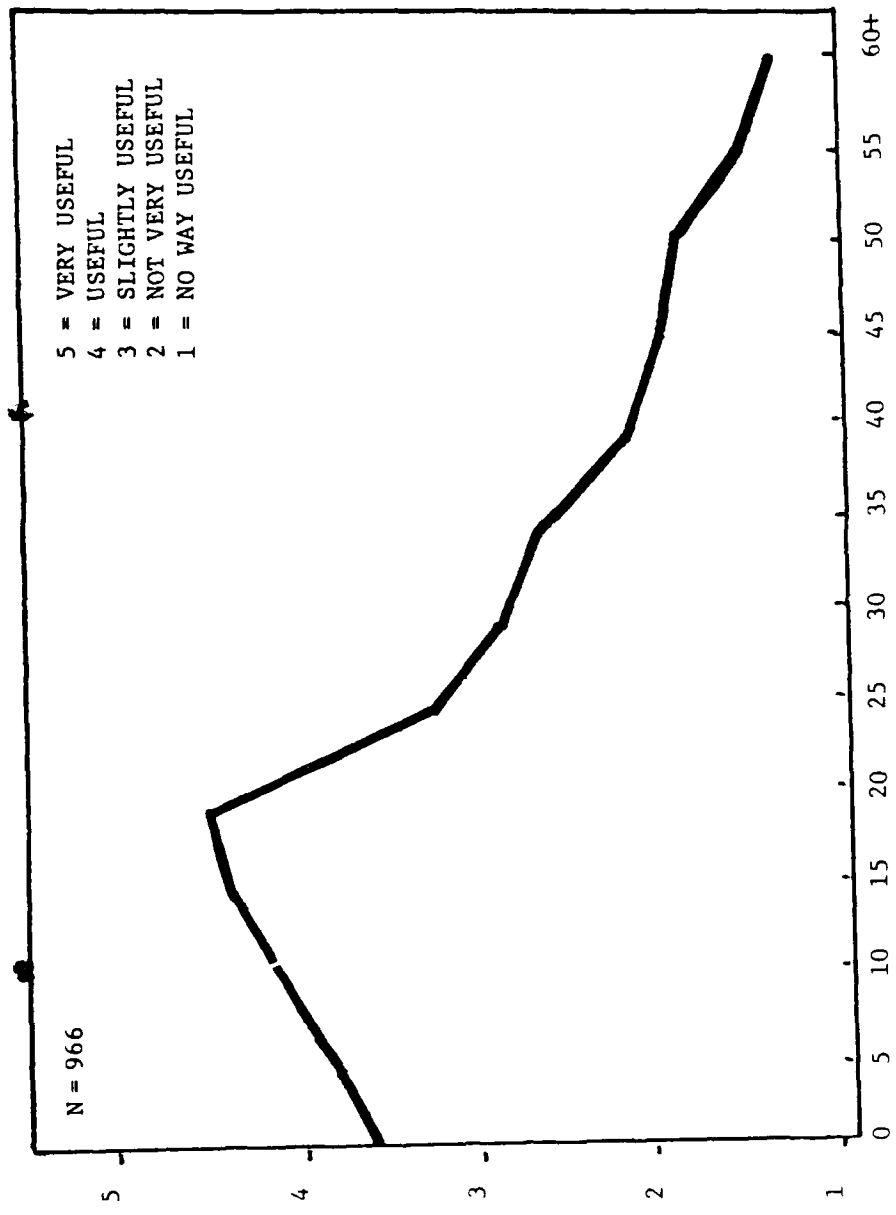
Q. "Assume that a unit summary has its maximal utility if it is provided to you immediately after soldiers finish taking an SQT. What percent of its maximal utility does the unit summary retain if it's provided to you at the following times after the SQT is taken: (write a percentage in each blank).

- A. After 15 days \_\_\_\_\_%
- B. After 30 days \_\_\_\_\_%
- C. After 60 days \_\_\_\_\_%
- D. After 90 days \_\_\_\_\_%
- E. After 120 days \_\_\_\_\_%

1. Eighty training managers responded. Regression analysis was used to find a "line of best fit" for their responses.

SQT LSE

ISR SURVEY RESULTS



DAYS	N	MN RESP
0-1	29	3.66
2-5	106	3.87
6-10	261	4.17
11-15	118	4.40
16-20	81	4.53
21-25	66	3.26
26-30	85	2.74
31-35	81	2.52
36-40	93	2.16
41-45	14	2.00
46-50	10	1.90
51-55	10	1.50
56-60+	12	1.38

GRAPH 1

77a

AD-A097 105

ARMY TRAINING BOARD FORT EUSTIS VA  
MANAGEMENT INFORMATION SYSTEM ECONOMIC ANALYSIS (MISEA) FOR SKI--ETC(U)  
JAN 81

F/6 5/9

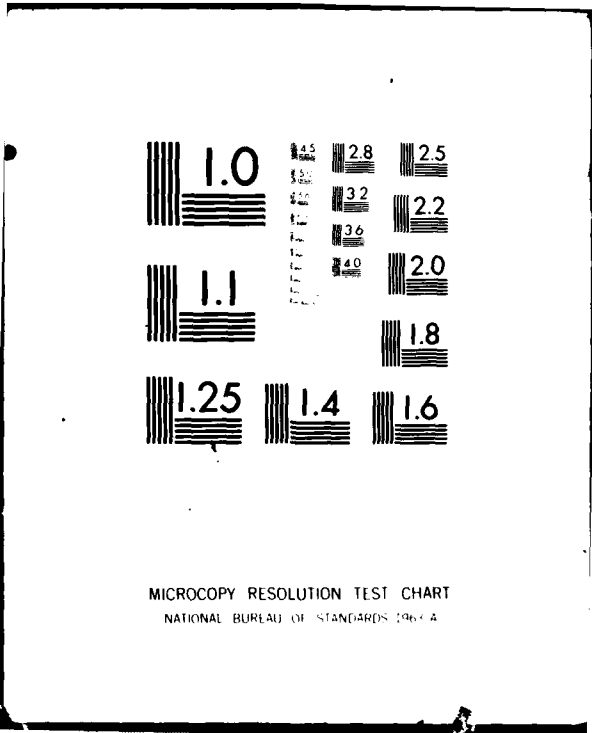
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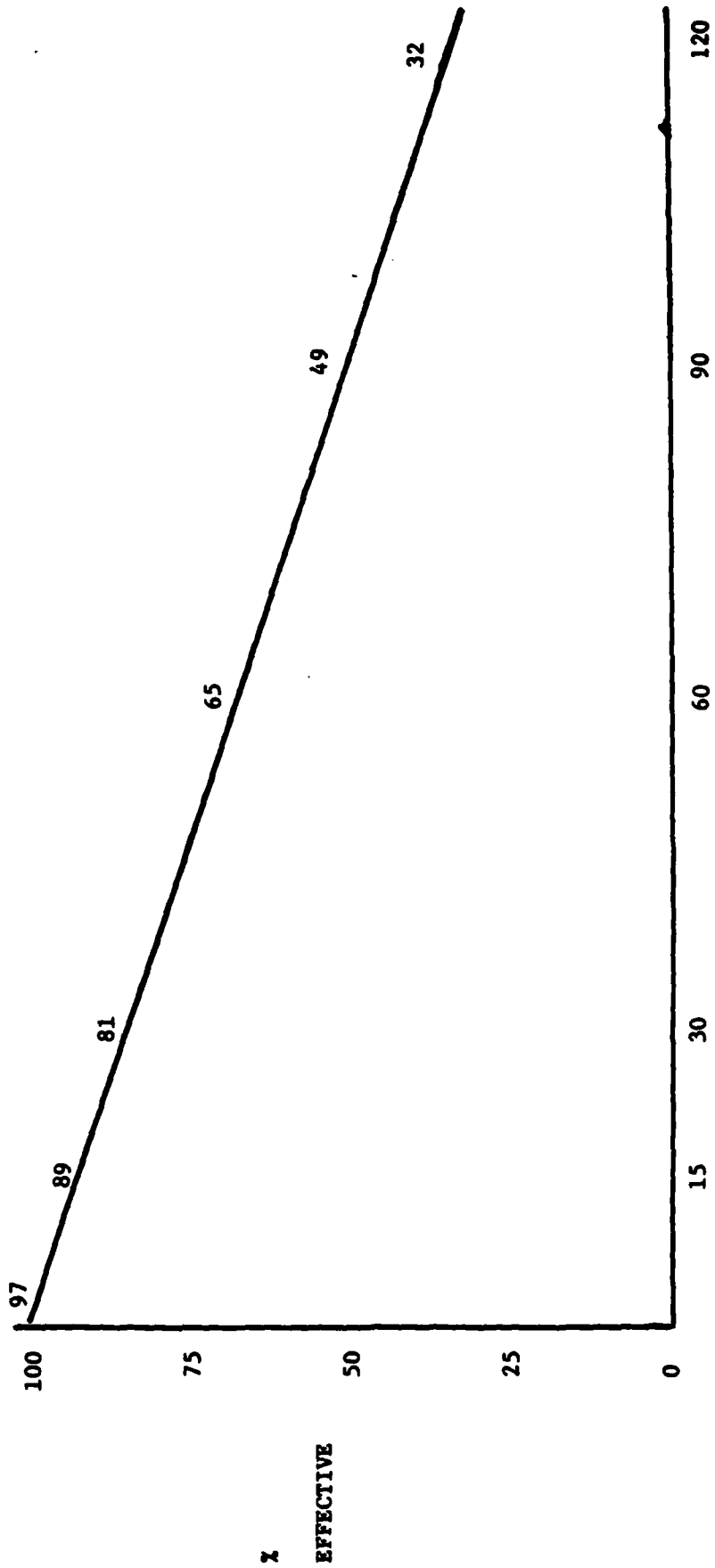
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A

2. Graph 2 shows the results of the regression. Correlation coefficient was determined to be - 0.7, slope of the line (m) is - 0.54, with y intercept (1) at 97.26.

3. Summaries were provided on demand and could be requested by such parameters as MOS, Skill Level, SQT track, time period, or unit from company thru division. Processing and print time ranged from 3 hours for a typical company to 24 hours for a division report.

TRAINING MANAGER SURVEYS - QUESTION #18

N - 80



# DAYS AFTER GROUP TESTED

GRAPH 2

78a

COST ESTIMATE  
CONDUCT OF REGIONAL/LOCAL SCORING TEST

1. Alternative 4, as discussed in the SQT Scoring and Feedback Economic Analysis, is conceptual. While technology exists to establish such a system, necessary performance and cost data cannot be determined without conducting a field evaluation or operational test.

2. Extensive liaison with data processors and communications specialists has been accomplished to determine if government owned ADPE exists that can support the test. Maximum savings will result in the use of as much government equipment as possible.

3. Outlined below are requirements for the conduct of the test. Where applicable, the source of equipment and/or personnel is noted. These sources were derived from the activities mentioned in 2 above.

4. Requirements:

a. Three IBM 5110/5120 minicomputers. These will be used as local terminals to format and transmit images of the mark-sense forms to the regional computer and to print any reports that are returned. One 5110 is government owned (USATB) and two are on hand from conduct of the six month evaluation of Alternative 2. A contract to retain these must be let.

Proposed locations during the test are (1) 5110 at Ft Eustis; (2) 5120 at Ft Sill; (3) 5120 at Ft Hood.

b. Three NCS 7001 Optical Scanners. These scanners will mate with each of the IBM 5110/5120 computers in 4a above. Two are on hand under existing contracts with NCS; one additional set must be procured for the duration of any test.

c. One IBM 4331 System mainframe. The only available system that will match the communications protocols of the IBM 5110/5120. One is located at Ft Sill in the Management Information Systems Office (MISO). The system must be upgraded to an IBM 4331 Group 2 to allow required interface with the 5110/5120 and to insure no degradation of the systems already on the 4331.

d. Two MODEM (communications adapters). These will allow the two 5110/5120 at Ft Hood and Ft Eustis to communicate with the regional computer at Ft Sill. Ft Sill's MISO has agreed to supply a MODEM for the 5120 to be located there. This hardware is available thru contract with IBM; software features necessary are provided with the MODEM.

INCL 2

e. Dedicated commercial land lines. These lines provide the data links from Forts Eustis and Hood to the computer at Fort Sill. Dial up lines are not adequate (300 BAUD) to carry the large volume of data that will be transmitted. Dedicated lines will provide the necessary 4800 BAUD needed. Lines are available commercially thru the Bell system; costs are based on the miles between terminals. Ft Sill will pay the cost for the link at Ft Sill.

f. TDY/Travel. Costs will be incurred for necessary travel to and from Ft Eustis and the field sites of the local and regional computers. These costs will be substantial until the system upgrade of the IBM 4331 is complete, when software development can be done from Ft Eustis via data link.

g. Software development will be in house with government employees.

5. Calculation of Costs: Cost Calculations are based on the requirements outlined above and are detailed below. The time frame of the test cannot extend beyond 30 June 1981 and actual operation will require 90 days. Contact with IBM and Bell Telephone have given minimum lead times for provision of lines and equipment.

a. Communications

(1) Communications line, 60 days lead time.

(a) Ft Sill to Ft Hood \$454 mo x 6 mo = \$2,724

(b) Ft Sill to Ft Eustis \$960 mo x 6 mo = \$5,760

(c) Installation fee (1 time cost) \$425 x 2 = \$850

(2) Ft Sill MODEMS = \$400

(3) Tolls Ft Hood to Ft Sill = \$500

TOTAL = \$10,234

b. IBM 5110/5120's.

(1) Upgrade one government owned 5110 with:

(a) 3701 EIA/CCITT Interface = \$430.

(b) 2074 Binary Synchronous Communications Adapter = \$1,800.

(2) Maintenance of one government owned 5110 at \$210 per mo x 6 mo = \$1,260.

(3) Rental of two IBM 5120's at \$1,685 per mo ea x 6 mo = \$20,220.

TOTAL = \$23,710

c. IBM 5110/5120 Software.

Business Report/Application Development System (BRADS)

\$85 mo x 6 mo = \$510

d. NCS 7001 Scanners.

(1) We now have two 7001 scanners on lease and must add one additional 7001 for the OT.

(2) Rental of 7001 scanners at \$790 per mo ea x 3 = \$2,370 x 6 mo = \$14,220

e. Regional Site Hardware.

(1) In order for Ft Sill MISO to support the Regional SQT OT without degrading their own operations, they must upgrade their IBM 4331 to an IBM 4331 Group 2 with the following configuration:

QUANTITY	EQUIPMENT	LEASE	MAINTENANCE
1	4331 Group 2 Processor	\$2,232	600
	Support Cost for above	627	-----
1	3705-E2 Communications Controller	2,200	276
1	3276-2 Work Station Controller at Ft Eustis	246	-----
2	3278-2 Work Stations at Ft Eustis	154	32
	TOTAL	\$5,459	\$908

(2) Of the above total (\$6,367 per mo) ATSC must fund \$4,832 per mo for the duration of the regional OT. \$4,832 x 6 mo

= TOTAL \$28,992

f. Transportation of Equipment (one time).

(1) CRT's shipped from Ft Sill to Ft Eustis and return \$500.

(2) IBM 5120's shipped from Ft Eustis to Ft Sill and Ft Hood and return \$1,000.

= TOTAL \$ 1,500

g. TDY Travel.

Two programmers will be at Ft Sill until the communications lines are installed (60 days) and periodic visits will account for 20 more days at Ft Sill for a total of 140 days. Similarly, an estimated 30 man days will be spent at Ft Hood.

(1) Ft Sill TDY/Travel	
140 days @ \$50 ea =	\$ 7,000
Rental Car @ \$25 per day =	\$ 2,000
Air fare (4 trips @ \$400 ea) =	<u>\$ 1,600</u>
TOTAL	\$10,600
(2) Ft Hood TDY/Travel	
30 days @ \$50 per day	\$ 1,500
Rental car @ \$25 per day	\$ 750
Air fare (3 trips @ \$400 ea)	<u>\$ 1,200</u>
TOTAL	\$ 3,450
(3) Total TDY/Travel	\$14,050

h. Total Cost

Communications	\$ 10,234
IBM 5110/5120's Hardware	\$ 23,710
IBM 5110/5120's Software	\$ 510
NCS 7001 Scanners	\$ 14,220
Regional Site Hardware	\$ 28,992
Transportation of Equipment	\$ 1,500
TDY Travel	<u>\$ 14,050</u>
TOTAL	\$ 93,216

(\$33,000 of the total \$93,216 has been funded. The difference of \$60,216 is an unfinanced requirement.)

