

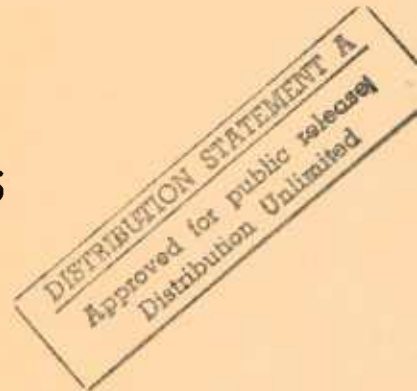


COST EFFECTIVENESS PROGRAM PLAN for JOINT TACTICAL COMMUNICATIONS

VOLUME III LIFE CYCLE COSTING

APPENDIX D MILITARY PERSONNEL AND TRAINING COSTS

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APPENDIX D

Military Personnel and Training Costs

VOLUME III

Life Cycle Costing

COST EFFECTIVENESS PROGRAM PLAN

FOR

JOINT TACTICAL COMMUNICATIONS

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Joint Tactical Communications Office
Fort Monmouth, New Jersey

SUPERSESSION

This report is an update and a replacement of the October 1976 issue by Cpt D. J. Boyd, USAF, TRI-TAC Office. Cost data has been updated with the latest available information. Where no new data are available, existing figures are inflated to FY79 dollars. The Replacement Turnover Rates for all services are unchanged due to lack of more recent information. The previous issues of this appendix should be destroyed.

Questions regarding this Appendix or Volume III, Life Cycle Costing, may be directed to the following individuals:

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TABLE OF CONTENTS

		<u>Page</u>
1.0	Introduction	D-1
2.0	Elements of Military Personnel and Training Costs	D-4
3.0	Basic and Specialized Training Costs U. S. Army	D-16
4.0	Basic and Specialized Training Costs U. S. Navy	D-19
5.0	Basic and Specialized Training Costs U. S. Air Force	D-25
6.0	Basic and Specialized Training Costs	D-28
7.0	Sample Calculations	D-30
8.0	References	D-32

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Fiscal Year 1979 Annual Composite Standard Rates Adjusted for Pay Raise Effective October 1, 1978 - ARMY	D-7
2	Fiscal Year 1979 Annual Composite Standard Rates Adjusted for Pay Raise Effective October 1, 1978 - NAVY	D-8
3	Fiscal Year 1979 Annual Composite Standard Rates Adjusted for Pay Raise Effective October 1, 1978 - MARINE CORPS	D-9
4	Fiscal Year 1979 Annual Composite Standard Rates Adjusted for Pay Raise Effective October 1, 1978 - AIR FORCE	D-10
5	Average Annual Military Pay Rates	D-11
6	Permanent Change of Station (PCS) Costs to Include Movement of Household Goods	D-11
7	Percentage of Military Personnel on Active Duty 30 June 1976 Expected to Continue on Active Duty to Retirement, by Pay Grade	D-12
8	Annual Medical Costs	D-15
9	Annual Base Operations Costs	D-15
10	Annual Recruiting, Accession Travel, Basic Training, and Communications Specialized Training Cost	D-15
11	U. S. Army Training Costs by MOS	D-18
12	U. S. Navy Training Costs by NEC	D-22
13	U. S. Air Force Training Costs by AFSC	D-27
14	U. S. Marine Corps Training Costs by MOS	D-29

APPENDIX D

MILITARY PERSONNEL AND TRAINING COSTS

1.0 INTRODUCTION

1.1 Background

Volume III of the Cost-Effectiveness Program Plan for Joint Tactical Communications, Life Cycle Costing, presents guidelines and methodology for employing the fundamental concepts of life cycle costing in the planning and acquisition of TRI-TAC systems, subsystems, and equipment. The volume is aimed at establishing a consistent vocabulary and framework of analysis for application by the Services/Agencies on tasked TRI-TAC equipment programs and joint planning studies.

Three appendices are contained in Volume III:

- a. Appendix A - Cost Element Definitions
- b. Appendix B - Sample Operating and Support Cost Estimating Relationships
- c. Appendix C - Cost Definitions

In addition to this appendix, the following appendices have been published as separate documents:

- a. Appendix E - Transportation Costs of Spares and Repair Parts
- b. Appendix F - Computer Models for LCC
- c. Appendix G - Cost Uncertainty Model

1.2 Purpose of Appendix D

The guidelines and methodology of Volume III outline the general problems of estimating total future acquisition and ownership costs of joint tactical communications in a manner compatible with OSD and Service directives and procedures. Cost estimating relationships are based largely on a synthesis of Service/Agency logistic support costing concepts and procedures as modified to address the TRI-TAC Program.

The purpose of Appendix D is to provide a methodology, appropriate cost tables, and a set of sample calculations that will enable the cost analyst to calculate the economic cost to DOD of selected types of military personnel. More specifically, Appendix D provides information for those equations presented in Volume III that require annual or hourly military personnel and training costs.

The economic cost factors presented in this appendix are appropriate for estimating the cost to the DOD of notional personnel who are characteristic of the force; however, because the economic cost factors are in a sense Service averages, they may be irrelevant for decisions concerned with the cost of particular individual personnel or positions or for budgetary studies.

It should be noted that certain costs outside the DOD are not included. Examples of these cost types are: Dependency and Indemnity Compensation (Veterans Administration), Unemployment Compensation (Department of Labor), Educational Benefits (Veterans Administration), and Income Tax Adjustment (Federal Government).

1.3 Organization of Document

This appendix is divided into eight sections. Section 1 provides the basic purpose and organization of the document. It also includes a discussion of some general aspects of military personnel costs.

Section 2 provides the elements of personnel and training costs. Tables are presented which enable the analyst to calculate the following elements of cost: Basic pay and allowances; permanent change-of-station (PCS); retirement; support costs; and basic and specialized training costs.

Sections 3, 4, 5, and 6 provide cost tables and rationale for the calculation of basic and specialized training.

Sample calculations are presented in Section 7. The examples are designed to demonstrate the use of the cost tables provided in Sections 2 through 6. References are provided in Section 8.

1.4 General Aspects of Military Personnel Costs

1.4.1 Differences in Service Personnel Cost Data

Many of the military personnel cost factors published by one Service differ from another Service because of varying missions, force structures, and/or facilities. Differences in the methods used by the Services to classify occupational specialties, identify skill levels, and calculate turnover rates impact on the ability of the cost analyst to make inter-Service cost comparisons and cost consolidations. Furthermore, training costs are published by the Services in different formats and, as far as can be determined, under no joint program or standard guidelines. Therefore all personnel and training costs in this appendix are presented separately by military service.

1.4.2 Replacement Turnover Rate

Replacement turnover rate (RTR) is defined as the rate at which replacements must be trained to replace losses of qualified personnel for authorized billets. Annual training costs can be calculated by taking the cost of the required training course or courses and multiplying it by the pertinent RTR. An RTR of 0.333 for a given occupational specialty indicates that one-third of the authorized personnel in that occupational specialty must be replaced and trained annually. For example, in the Navy, the Navy Enlisted Classification (NEC) CTO-48MC has an RTR of 0.291. The total cost for qualifying a sailor as a CTO-48MC is \$14,029 (which includes accession and recruit training costs). Multiplying the total cost of \$14,029 by the RTR of 0.291 provides the yearly training cost of \$4082.

1.4.3 Occupational Specialties

Each Service uses different nomenclature to describe occupational specialties. The Army and Marine Corps call them Military Occupational Specialties (MOS); the Navy calls them Navy Enlisted Classifications (NEC); and the Air Force refers to them as Air Force Specialty Codes (AFSC).

In the Army, skill levels are identified by the fourth and fifth characters of the MOS. The numbers 10, 20, 30, 40, and 50 are used with 50 indicating the highest skill level.

Skill levels in the Air Force are indicated by the fourth character of the AFSC. The numbers 3, 5, 7, and 9 are used with 9 indicating the highest skill level.

The Navy and Marine Corps do not indicate skill levels in their respective NECs or MOSs. Grade is the common determinant of skill level within a given speciality in these two Services.

DOD periodically publishes an "Occupational Conversion Table" (Reference 8.1). This table is a compilation of all enlisted occupational specialties in use in the Armed Services arranged under a common DOD occupational grouping and numerical coding system. This document can assist in making comparisons among like occupational specialties within the Services.

1.4.4 Calculation of Man-Hour Rates

The economic cost of a military man-hour can be determined by dividing the annual economic cost, calculated in accordance with Section 2, by the available active man-hours per year. Assuming a peacetime 40-hour work week, available man-hours can be calculated as follows:

52 weeks/yr x 40 hr/week	= 2080 hr/yr
30 days leave + 9 holidays or the equivalent of 6 normal 40-hr weeks	= <u>-240</u> hr
Subtotal	= 1840
Losses due CQ duties, sickness, etc. (est 10%)	= <u>-184</u>
Total available MH/Year	= 1656

Therefore, if the annual economic cost of a certain military person is calculated to be \$14,500, then the cost per man-hour would be:

$$\frac{\$14,500}{1656} \text{ or } \$8.76 \text{ per hour}$$

1.4.5 Perishability of Cost Data

Most of the cost data presented in this appendix is time-sensitive and periodically updated by the Services and DOD Agencies. As a result, TRI-TAC will periodically update the information contained herein.

2.0 ELEMENTS OF MILITARY PERSONNEL AND TRAINING COSTS

2.1 General

The economic cost of military personnel includes the following cost elements:

- a. Basic pay and allowances (composite standard rate)
- b. PCS travel
- c. Retirement
- d. Support Costs
- e. Replacement training (basic and specialized)

These elements represent significant economic costs to the DOD. Certain second-order costs financed by military personnel appropriations for military support positions or the support "tail" are excluded. Each of the cost elements is defined in the paragraphs that follow. Cost tables are provided which will enable the analyst to calculate the total annual economic cost to DOD of selected military personnel.

The standard rates for costing military personnel services are prescribed in "DoD Accounting Guidance Handbook," (Reference 8.2) which also describes their nature and composition. Essentially, the standard rates are average rates by grade which equate to the budget justifications for the military personnel appropriations, exclusive of PCS travel costs and support of free-world forces. The standard rates include cost elements for basic, incentive, and special pay, and for certain personnel-related expenses and allowances, including quarters and subsistence. A description of the above mentioned cost elements follows:

1. Basic pay - this element represents a weighted average for longevity increments for each pay grade, as provided in the President's budget justification.
2. Incentive and special pay - this element, computed separately for officer and enlisted personnel, is the average cost per man provided in the budget justification for:
 - a. Air crew and submarine duty
 - b. Other hazardous duty
 - c. Physicians and dentists
 - d. Sea duty and duty at certain locations
 - e. Proficiency pay
 - f. Hostile fire pay
3. Basic allowance for quarters - amounts provided in the President's budget justification for quarters allowance by pay grade are divided by the total man-years in each pay grade, as shown in the department military personnel plan, to arrive at the average cost for a military person in each pay grade.
4. Miscellaneous expense - this element, computed separately for officer and enlisted personnel, is the average cost per man provided in the budget justification for subsistence (cash and in kind), station allowances overseas, separation payments, social security tax (FICA), death gratuities, serviceman's life insurance, reenlistment and enlistment bonuses and apprehension of military deserters.

The standard rates do not include cost elements for personnel-related expenses which are financed by appropriations other than the military personnel appropriations, such as retirement costs and the costs associated with the occupancy of Government quarters. The standard rates presented in Tables 1 to 4 are the FY79 annual composite standard rates adjusted for the October 1, 1978 pay raise.

2.3 PCS Travel

PCS costs are not included in the DOD standard composite rates. However, they are considered to be part of the economic cost of military personnel. They include the cost of travel for military personnel and dependents together with the cost of transporting household goods. The PCS travel costs shown in Table 6 were calculated by dividing the FY79 and FY 80 budgeted amounts for PCS by total man-years; officers and enlisted are computed separately.

2.4 Retirement

The retirement cost is based on the discounted present value of expected future retirement benefits of military personnel now on active duty. To determine the economic cost, the average base pay by grade is multiplied by two percentages which have been calculated by the OASD (M&RA) Actuarial Consultant (Reference 8.3). One percentage is used to determine the normal retirement cost; the second percentage is used to adjust the normal retirement cost based on the proportion of military personnel on active duty who are expected to remain until retirement. The normal retirement cost percentages are as follows:

	<u>Officer</u>	<u>Enlisted</u>
Army	20.5	28.3
Navy	23.5	29.2
Marine Corps	21.8	34.9
Air Force	25.4	23.9

The percentages of military personnel expected to remain on active duty until retirement are presented in Table 7.

If military grade is unknown, DOD Accounting Guidance Handbook (Reference 8.2) indicates that a factor of 17 percent times the annual composite standard rate can be used to calculate annual retirement costs.

TABLE 1
FISCAL YEAR 1979
ANNUAL COMPOSITE STANDARD RATES
EFFECTIVE 1 OCTOBER 1978

<u>ARMY</u>					
<u>GRADE</u>	<u>BASIC PAY</u>	<u>BASIC ALLOWANCE FOR QUARTERS</u>	<u>MISCEL- LANEOUS EXPENSE</u>	<u>INCENTIVE AND SPECIAL PAY</u>	<u>ANNUAL COMPOSITE STANDARD RATE</u>
O-10	\$47,498	\$ -	\$6,479	\$ -	\$53,977
O-9	47,498	457	4,116	693	52,764
O-8	44,248	1,329	3,427	1,179	50,183
O-7	38,473	1,791	3,317	1,553	45,134
O-6	32,031	2,447	3,776	2,518	40,772
O-5	25,942	2,556	3,056	1,582	33,136
O-4	21,191	2,112	2,750	1,395	27,448
O-3	17,498	2,008	2,680	674	22,860
O-2	13,476	1,372	2,359	396	17,603
O-1	9,955	973	1,918	396	13,242
W-4	20,022	2,084	3,430	396	25,932
W-3	15,898	1,725	2,715	396	20,734
W-2	13,355	1,387	2,422	396	17,560
W-1	11,408	1,413	2,013	396	15,230
E-9	17,318	1,897	3,331	68	22,614
E-8	14,198	1,730	3,026	70	19,024
E-7	11,870	1,550	2,755	72	16,247
E-6	9,563	1,340	2,532	78	13,513
E-5	7,770	1,202	2,311	85	11,368
E-4	6,564	851	2,095	70	9,580
E-3	5,934	533	2,038	58	8,563
E-2	5,609	334	1,822	57	7,822
E-1	5,033	346	1,513	53	6,945
Cadets	4,212	-	1,327	-	5,539

Source: DOD Handbook 7220.9-H (Reference 8.2)

TABLE 2
FISCAL YEAR 1979
ANNUAL COMPOSITE STANDARD RATES
EFFECTIVE 1 OCTOBER 1978

NAVY

<u>GRADE</u>	<u>BASIC PAY</u>	<u>BASIC ALLOWANCE FOR QUARTERS</u>	<u>MISCEL- LANEOUS EXPENSE</u>	<u>INCENTIVE AND SPECIAL PAY</u>	<u>ANNUAL COMPOSITE STANDARD RATE</u>
O-10	\$47,498	\$ -	\$6,376	\$ 138	\$54,012
O-9	47,498	-	4,979	955	53,432
O-8	44,247	2,619	5,394	1,338	53,598
O-7	38,474	2,857	2,471	1,223	45,025
O-6	32,010	3,370	3,223	2,241	40,844
O-5	25,825	3,492	2,624	2,106	34,047
O-4	20,948	2,966	2,452	2,265	28,631
O-3	17,503	2,493	2,688	1,927	24,611
O-2	13,877	1,774	2,168	729	18,548
O-1	10,191	1,154	1,649	548	13,542
W-4	20,059	2,797	2,869	152	25,877
W-3	16,477	1,778	2,633	176	21,064
W-2	14,423	1,988	1,980	147	18,538
W-1	11,900	2,750	1,713	138	16,501
E-9	16,506	2,491	3,214	265	22,476
E-8	13,906	2,166	2,795	322	19,189
E-7	11,846	1,823	2,551	297	16,517
E-6	9,717	1,615	2,270	293	13,895
E-5	7,822	1,331	2,088	266	11,507
E-4	6,626	897	1,971	253	9,747
E-3	5,988	521	1,894	94	8,497
E-2	5,520	319	1,843	68	7,750
E-1	4,891	218	1,776	37	6,922
MIDSHIPMEN	4,212		1,325		5,537

SOURCE: DOD Handbook 7220.9-H (Reference 8.2)

TABLE 3
FISCAL YEAR 1979
ANNUAL COMPOSITE STANDARD RATES
EFFECTIVE 1 OCTOBER 1978

MARINE CORPS

<u>GRADE</u>	<u>BASIC PAY</u>	<u>BASIC ALLOWANCE FOR QUARTERS</u>	<u>MISCEL- LANEOUS EXPENSE</u>	<u>INCENTIVE AND SPECIAL PAY</u>	<u>ANNUAL COMPOSITE STANDARD RATE</u>
O-10	\$47,500	\$ -	\$6,947	\$ 16	\$54,463
O-9	47,500	2,344	4,518	16	54,378
O-8	44,247	2,344	3,946	16	50,553
O-7	38,474	2,344	3,946	77	44,841
O-6	32,775	3,181	2,911	578	39,445
O-5	26,747	3,212	2,528	954	33,441
O-4	22,005	2,673	2,357	867	27,902
O-3	18,032	2,481	2,497	839	23,849
O-2	14,399	1,749	2,415	503	19,066
O-1	10,436	866	2,128	216	13,646
W-4	20,025	2,060	2,273	104	24,462
W-3	16,518	1,397	2,273	104	20,292
W-2	13,170	2,233	2,273	104	17,780
W-1	11,532	2,208	2,273	104	16,117
E-9	16,816	2,612	2,214	118	21,760
E-8	13,660	2,208	2,038	121	18,027
E-7	11,186	1,917	1,907	146	15,156
E-6	8,955	1,636	1,989	124	12,704
E-5	7,207	1,187	2,018	110	10,522
E-4	6,383	705	1,911	97	9,096
E-3	5,874	407	1,650	29	7,960
E-2	5,436	224	1,754	25	7,439
E-1	4,858	169	1,710	25	6,762

Source: DOD Handbook 7220.9-H (Reference 8.2)

TABLE 4
FISCAL YEAR 1979
ANNUAL COMPOSITE STANDARD RATES
EFFECTIVE 1 OCTOBER 1978

AIR FORCE

<u>GRADE</u>	<u>BASIC PAY</u>	<u>BASIC ALLOWANCE FOR QUARTERS</u>	<u>MISCEL- LANEOUS EXPENSE</u>	<u>INCENTIVE AND SPECIAL PAY</u>	<u>ANNUAL COMPOSITE STANDARD RATE</u>
0-10	\$47,498	\$ -	\$6,470	\$ -	\$53,968
0-9	47,498	760	4,108	272	52,638
0-8	44,248	1,205	3,655	626	49,734
0-7	38,473	1,398	3,257	1,233	44,361
0-6	32,029	2,770	3,337	2,251	40,387
0-5	26,168	3,206	2,861	2,040	34,275
0-4	21,505	2,785	2,447	1,671	28,408
0-3	17,691	2,407	2,629	1,614	24,341
0-2	13,550	1,650	1,825	571	17,596
0-1	9,982	1,173	1,426	359	12,940
W-4	21,330	1,344	6,034	-	28,708
E-9	17,394	1,871	3,282	103	22,650
E-8	14,485	1,601	3,020	116	19,222
E-7	12,209	1,440	2,680	104	16,433
E-6	10,244	1,341	2,432	89	14,106
E-5	8,328	1,200	2,153	68	11,749
E-4	7,071	1,040	2,039	47	10,197
E-3	6,048	690	1,744	28	8,510
E-2	5,609	475	1,666	23	7,773
E-1	5,033	304	1,598	16	6,951
CADETS	4,212	-	1,323	-	5,535

SOURCE: DOD Handbook 7220.9-H (Ref 8.2)

TABLE 5
Average Annual Military Pay Rates
(Man-Year Basis)

<u>Pay and Allowances:</u>		<u>FY 1979</u>	<u>FY 1980</u>
Army	- Officers	\$20,567	\$20,526
	- Enlisted	9,525	9,559
Navy	- Officers	22,639	22,658
	- Enlisted	9,590	9,590
Marine Corps	- Officers	19,485	19,521
	- Enlisted	8,346	8,330
Air Force	- Officers	22,950	22,939
	- Enlisted	9,827	9,820

TABLE 6
Permanent Change of Station (PCS)
Costs to Include Movement of
Household Goods - Per Man-Year

<u>Travel (PCS & HHG)</u>		<u>FY 1979</u>	<u>FY 1980</u>
Army	- Officers	\$3,024	\$2,993
	- Enlisted	849	825
Navy	- Officers	1,509	1,510
	- Enlisted	491	491
Marine Corps	- Officers	1,495	1,496
	- Enlisted	423	425
Air Force	- Officers	1,511	1,504
	- Enlisted	754	760

Source: Five Year Defense Program (FYDP),
ASD (Comptroller),
(Reference 8.5).

TABLE 7

PERCENTAGE OF MILITARY PERSONNEL ON ACTIVE DUTY 30 JUNE 1976
EXPECTED TO CONTINUE ON ACTIVE DUTY TO RETIREMENT, BY PAY GRADE

<u>GRADE</u>	<u>DOD TOTAL</u>	<u>ARMY</u>	<u>NAVY</u>	<u>MARINE CORPS</u>	<u>AIR FORCE</u>
0-10	98.7	98.9	99.1	99.4	98.2
0-9	98.7	98.9	99.2	99.4	98.1
0-8	98.7	98.9	99.2	99.3	98.0
0-7	98.7	98.7	99.3	99.9	97.7
0-6	97.8	98.2	98.4	98.7	96.8
0-5	96.0	96.2	96.1	98.0	95.4
0-4	86.7	86.7	82.5	93.8	88.4
0-3	64.3	73.6	54.8	63.0	61.4
0-2	36.6	40.7	37.9	32.7	33.6
0-1	27.6	28.1	29.8	18.9	28.1
COMMISSIONED OFFICERS	66.3	70.7	63.0	56.5	66.3
W-4	98.1	97.9	99.0	98.4	97.9
W-3	96.8	96.1	98.1	97.7	0.
W-2	87.7	85.8	95.1	86.2	0.
W-1	74.1	74.6	88.2	70.3	0.
WARRANT OFFICERS	89.2	87.6	96.5	85.8	97.9
ALL OFFICERS	67.7	72.9	64.7	58.2	66.3
E-9	98.1	98.2	98.3	97.0	98.1
E-8	98.8	98.1	97.9	96.9	98.2
E-7	96.5	96.5	96.0	93.1	97.8
E-6	86.4	82.5	86.4	69.3	95.3
E-5	61.9	56.5	59.7	34.4	76.9
E-4	27.5	26.3	25.2	14.1	34.3
E-3	15.2	15.4	16.1	11.3	15.7
E-2	13.1	13.8	12.7	10.4	14.1
E-1	12.8	13.4	12.4	10.4	14.0
ALL ENLISTED	41.4	38.7	42.3	25.8	50.1
ALL PERSONNEL	45.0	43.1	45.1	29.0	52.9

SOURCE: OASD (MRA&L)
Actuary
Sept 19, 1977

2.5

Support Costs

This cost element represents an allocated portion of "medical" and "base operations" support costs financed by operation and maintenance appropriations which are not otherwise included as part of the economic costs.

The medical element encompasses the costs for operation of military hospitals and Government-paid costs for civilian hospitals associated with care of military personnel and their dependents. Excluded are the operating costs for base dispensaries, and medical and dental clinics which are included in the base operations cost element. The annual medical cost per man-year is shown in Table 8 for the military departments.

Base operations costs are incurred by the host organization or command in providing post, camp, station, or base-level support. This support may be control, supervision, or administration of the military and civilian personnel services made available through funds budgeted for and available to the host organization to operate the post or base.

The base operations cost factor accounts for manpower, supplies, equipment, and facilities related to the performance of the following base and garrison functions:

- a. Command (post, camp, or base level only)
- b. Judge Advocate
- c. Information
- d. Chaplain
- e. Safety
- f. Material
- g. Operations
- h. Plans and Programs
- i. Personnel
- j. Civil Engineering
- k. Telecommunications (non-DCS)
- l. Administrative Services

- m. Base procurement
- n. Comptroller
- o. Fuel
- p. Transportation
- q. Security (Military Police)
- r. Audio/visual laboratory
- s. Bands
- t. Dispensaries/clinics
- u. Dependent schools
- v. Food service
- w. Navy/Fleet Shore Stations

The annual cost for base operations per man-year is shown in Table 9 for the military departments.

2.6 Replacement Training

This cost element represents the variable and fixed costs related to the accession, basic training, initial skill level training, and technical/specialized training of replacement personnel. These training costs by Service for selected occupational specialties applicable to TRI-TAC systems and equipment are provided in the Sections 3 through 6. Table 10 provides some useful cost factors from DCA Circular 600-60-1 (Reference 8.4) which can be used when the occupational specialty is not known.

TABLE 8
Annual Medical Costs
Per Man-Year

<u>Category</u>	<u>Army</u>	<u>Navy</u>	<u>Air Force</u>
Officers	\$320	\$810	\$730
Enlisted	320	810	630

Source: DCA Circular 600-60-1 (Ref 8.4)

TABLE 9
Annual Base Operations
Costs Per Man-Year

<u>Military Department</u>	<u>Cost per Man-Year</u>
Army	\$650
Navy	456
Air Force	593

Source: DCA Circular 600-60-1 (Ref 8.4)

TABLE 10
Annual Recruiting, Accession Travel,
Basic Training, and Communications
Specialized Training Cost

<u>Category</u>	<u>Army</u>	<u>Navy</u>	<u>Air Force</u>
Officers	\$8855	\$5490	\$5715
Enlisted	5750	4540	3170

Source: DCA Circular 600-60-1 (Ref 8.4)

3.0 BASIC AND SPECIALIZED TRAINING COSTS - U. S. ARMY

3.1 General

This section provides cost data and rationale for the calculation of training costs for selected Army military personnel. The following elements are included: accession costs, basic combat training (BCT) costs, and Military Occupational Specialty (MOS) training costs to include costs of feeder MOS training. All of these elements are included in Table 11. Table 11 contains cost data and RTR information for those MOSs that may operate or maintain equipment developed under the TRI-TAC Program. The total annual replacement training cost is calculated by multiplying the MOS training cost by the RTR.

3.2 Detailed Explanation of Table 11

3.2.1 General

Costs shown in Table 11 include direct and indirect fixed and variable costs. Fixed costs are those which remain relatively constant even when the number of students in a course varies. Examples of fixed costs are depreciation of equipment, minimum consumption of utilities, pay of minimum ground staff, etc. Variable costs are directly proportional to the number of students. Examples of variable costs are student pay and allowances, pay of increasing/decreasing numbers of instructors, expenditures of ammunition, etc. The variable costs represent a combination of installation, instructional, facility, and course average incremental costs proportionally derived from historical observation of average incremental cost increases.

3.2.2 Cost of Accessions (Reference 8.10)

Costs include the following items:

1. Recruiting, initial issue of clothing and equipment, and accession travel	\$799
2. Trainee Leave	<u>346</u>
Total cost of accession	\$1145

3.2.3 Cost of Basic Combat Training (BCT) (Reference 8.7)

1. Personnel	\$2137
2. Operations and Maintenance	<u>777</u>
Total BCT Cost	\$2914

3.2.4 Cost of MOS Training (Reference 8.7)

The cost for qualifying for each MOS shown in Table 11 is a cumulative cost of all formal training (BCT and MOS training). For example, MOS 05B40 training costs are listed in Table 11 as \$7550. Included is the cost of BCT, the cost of a feeder MOS course (MOS 05B20), and the cost of the MOS 05B40 producing course. The costs shown in Table 11 are expressed in FY79 dollars.

On-the-job training (OJT) involves the learning of a skill and the qualification for an MOS while performing the functions of that MOS skill in an ongoing operational unit. No method currently exists to break down what portion of the OJT soldier's time is training-related and what portion is duty-related. For this reason OJT associated training costs are not included in Table 11. It should be noted however, that some personnel acquiring a certain MOS may in fact receive the MOS skill level through OJT. Thus the average per capita cost (Army wide) of moving to a higher MOS skill level is usually somewhat lower than the cost of the formal course. It is this average or weighted cumulative cost of acquiring the MOS that is used in developing Table 11.

3.2.5 Replacement Turnover Rates

The replacement turnover rates shown in Table 11 were obtained from Dept of Army, DCS Personnel, Enlisted Personnel Directorate, Review and Analysis Branch (DAPC-EPO-A). If the analyst is required to determine the training cost for a MOS not shown in Table 11, Reference 8.10 indicates that an RTR of 0.279 may be used.

TABLE 11

U. S. ARMY TRAINING COSTS
BY MOS - FY79

<u>MOS</u>	<u>TITLE</u>	<u>TRAINING COST*</u>	<u>RTR**</u>
05B20/40	Radio Operator	7,550.	.20
05C20	Radio Teletype Operator	13,008.	.27
26L10	Tactical Microwave Repairman	9,252.	.23
26L20/40	Tactical Microwave Repairman	21,184.	.20
26N20	Surveillance Infrared Repairman	40,935.	.37
26V20/40/50	Strategic Microwave System Repairman	20,996.	.14
26Y20/40	Satellite Communications Ground Station Equipment Repairman	16,562.	.26
31B20	Field Radio Mechanic	8,685.	.27
31E20	Field Radio Repairman	14,477.	.28
31J20	Teletype Repairman	11,484.	.27
31J20/40	Field Radio Relay Equipment Repairman	17,211.	.16
31M20/40	Radio Relay & Carrier Attendant	9,546.	.20
31N20/40	Tactical Circuit Controller	12,119.	.20
31S20	Field General Comsec Repairman	9,123.	.31
31S30	Field General Comsec Repairman	22,610.	.38
31T30	Field System Comsec Repairman	21,577.	.28
32A10	Fixed Station Attendant	8,662.	.26
32B20/40	Fixed Station Receiver Attendant	22,164.	.26
32C20/40	Fixed Station Transmitter Attendant	8,662.	.26
32D20/40	Fixed Station Technical Controller	16,288.	.17
32E20/40	Fixed Plant Carrier Attendant	17,841.	.19
32F20/40	Fixed Ciphony Repairman	18,057.	.25
32G20/40	Fixed Cryptographic Equipment Repairman	13,028.	.22
35B20	Electronic Instrument Repairman	12,882.	.36
35D20	Meteorological Instrument Repairman	17,113.	.30
35K20	Avionics Mechanic	9,802.	.24
35L20	Avionic Communications Equipment Rprman	14,606.	.16
36G20	Manual Central Office Repairman	9,961.	.24
36H20/40	Dial Center Office Repairman	16,563.	.15
41F20	Projector Repairman	8,407.	.27
51A10	Construction and Utilities Worker	7,184.	.16
52B20	Power Generation Equipment OPR & MECH	8,006.	.22
72B10	Communications Center Specialist	4,059.	.25
72B20/30/40	Communications Center Specialist	7,308.	.25
72C20/40	Telephone Switchboard Operator	6,843.	.29
74F20	Computer Programmer	7,238.	.29

*Cost includes cost of BCT, cost of MOS course and cost of feeder MOS course, if required.

**Replacement Turnover Rates shown are for 1974 data.

4.0 BASIC AND SPECIALIZED TRAINING COSTS - U. S. NAVY

4.1 General

This section provides cost data and rationale for the calculation of training costs for selected Navy military personnel. The following elements are included: accession costs, recruit training costs, and Navy Enlisted Classification (NEC) training costs to include NEC field courses if required. Table 12 contains cost data and RTR information for those NECs that may operate or maintain equipment developed under the TRI-TAC Program. The total annual replacement training cost is calculated by multiplying the NEC training costs by the RTR.

Currently, the Navy is revising its NEC structure. Since both the old and new NECs appear in Navy personnel and training documentation, both are presented in Table 12.

4.2 Detailed Explanation of Table 12

4.2.1 Cost of NEC Training (Reference 8.8)

The cost of qualifying for each NEC shown in Table 12 is a cumulative cost of all formal training needed to acquire NEC eligibility.

For example, NEC CTO-48MC training costs include two pre-requisite "A" schools and basic costs (accession and recruit training). Therefore, the true training cost shown above for NEC CTO-48MC qualification is the cost of all previous courses required, not just the CTO-48MC course itself.

The costs for those ratings and NECs for which OJT is included are based on the trainees' pay and allowances (approximately 50 percent of the OJT period) and the supervisor's pay and allowance for 5 percent of the OJT period.

Included in the costs shown in Table 12 are the cost of direct training; cost of operation and maintenance of other than real property; cost of operation and maintenance of real property facilities; pay, allowances, and subsistence of military instructional staff and military support overhead personnel; and travel of staff and students.

Training costs are based on FY72 data provided by the Chief of Naval Operations (OP-0992E), and the Bureau of Medicine and Surgery (Code 463).

The value of the leave accrued by students during training periods is based on the pay of the pay grade held at the time leave is earned. Pro pay is included where appropriate. The value of leave accrued by instructor and support personnel is also included.

4.2.2 Cost of Accession and Recruit Training

The Navy combines cost of accession with recruit training and classifies this combination as basic costs. These costs apply to all ratings and NECs and cover the period from procurement through transfer from recruit training to the first permanent duty station. The first permanent duty station may be an operational billet or school of 20 weeks or more duration. Travel costs for this move are included in accession travel. The following is a breakdown of the basic costs:

Cost Elements

Accession	\$ 614.99
Accession Travel	233.68
Initial Uniform Issue	268.68
Recruit Training (9 weeks x \$92.83)	835.47
Pay & Allowances, Student (9 weeks x \$106.50)	958.50
Accrued Leave, Student (5.19 days x \$15.21)	78.98
Accrued Leave, Instructor & Support Personnel (5.19 days x \$5.33)	<u>27.68</u>
Total Cost to First Permanent Duty Station	\$3017.98

The cost of accession includes such recruiting costs as advertising, printing, travel of applicants, vehicles, lodgings and subsistence, rent and utilities, etc. Accession travel consists of travel from recruiting station to boot camp to a permanent duty station. Initial uniform allowance represents the cost for a male recruit. Recruit training costs is based on 9 weeks training (including 1 week processing time) multiplies by the weekly cost of recruit training. Cost of recruit training includes direct training costs, operation and maintenance of other than real property, and real property, travel, logistics support, and pay and allowances of instructors.

4.2.3 Replacement Turnover Rate - U. S. Navy*

Navy RTR was derived by dividing the yearly NEC school training requirements by the total billets in a particular NEC, as follows:

$$\text{RTR} = \frac{\text{yearly NEC training requirement}}{\text{total billet requirement by NEC}}$$

Since both training, and to a lesser extent, billet requirements fluctuate, a leveling out of these requirements was accomplished by using an average of 6 years NEC billet requirements and an average of 5 years NEC training requirements. Therefore,

$$\text{RTR} = \frac{\frac{\text{NEC Trng. Req. (FY75 through 79)}}{5}}{\frac{\text{NEC Billet Req. (FY75 through 80)}}{6}}$$

If the analyst is required to determine the RTR for an NEC not shown in Table 12, an RTR of 0.274 may be used. This factor is the average of all RTRs in Table 12 and is the factor used by NAVELEX when exercising the level of repair (LOR) model.

* Source: Active Enlisted Plans Branch, Bureau of Personnel
Department of the Navy.

TABLE 12
U. S. NAVY TRAINING COSTS
BY NEC - FY 79.

<u>NEC</u>	<u>New NEC</u>	<u>Title</u>	<u>Training Cost*</u>	<u>RTR</u>
CTO-2319	CTO-48MB	Tactical Communications Operations and Management Systems Technician	22,252	0.400
CTO-2461	CTO-48MC	Communications Technical Controller	14,029	0.291
CTO-2342	CTO-48JA	MOD-28 TTY and Low-land Keying Maintenance Technician	26,104	0.406
CTM-1539	CTM-48KC	KW 7/KWR 37 Maintenance Technician	26,182	0.460
CTM-1549	CTM-48JH	KWT-37 Maintenance Technician	24,833	0.400
CTM-1546	CTM-48JK	KY3-Maintenance Technician	23,307	0.488
CTM-1549	CTM-48JJ	Bistep Maintenance Technician	30,975	0.500
CTM-1543	CTM-48JF	KW-26 Maintenance Technician	25,171	0.181
CTM-1542	CTM-48JI	KG-14 Maintenance Technician	26,723	0.551
CTM-2442	CTM-48IK	AN/TCA-8 Demultiplex Maintenance Technician	29,306	0.254
CTM-2443	CTM-48IH	Flexscop (AN/GYK-9) Computer System Maintenance Technician	37,870	0.133
CTM-2444	CTM-4811	AN/GSQ 76 System Maintenance Technician	29,306	0.219
CTM-2449	CTM-481S	AN/FRA-54 Equipment Maintenance Technician	30,287	0.148
CTM-2452	CTM-48JC	Strawhat Maintenance Technician (High Speed Teletype & Message Processing Equipment Technician)	53,746	0.120
CTM-2453	CTM-48JB	Strawhat Terminal (KG 13) Maintenance Technician	44,253	0.110
RM 2305	-----	DCS Satellite Communication Terminal Operator AN/MS-46 and AN/TSC-54	8,289	0.164
CTT2411	CTT-48CB	Advanced Radio Printer Systems Operations Technician	24,482	0.232
CTM2416	CTT-48BA	AN/FLR-11/FLR-15 Acquisition Technician	13,864	0.224
CTM2457	CTM-4810	SISS ZULU Digital Computer Technician System Technician	26,664	0.369
CTM2447	CTM-48IF	Net Control Computer (AN(GYK-3) Maintenance Technician	26,664	0.369
ET1562	ET1462	Special Maintenance (AN/MS-46 Satellite Communications) Technician	34,413	0.323

*Cost is FY72 data inflated to FY79 and includes basic costs, cost of NEC courses and NEC field courses if required.

TABLE 12 (CONTD)

<u>NEC</u>	<u>New NEC</u>	<u>Title</u>	<u>Training Cost*</u>	<u>RTR</u>
ET1563	ET1463	Special Maintenance AN/TSC-54 Satellite Communications Technician	33,933	0.156
ET1564	ET1464	Special Maintenance Tactical Satellite Communications Technician	27,059	.276
ET1596	ET1412	Special Fixed Communications Maintenance Technician	28,703	.217
CT2472	CTR-48QB	AN/GYK-3 (cd-813) and AN/UYK-3(cp 771) HFDF Computer Programmer	25,667	0.181
ET1567	ET48JD	ET1411 Digital Subscriber Terminal Equipment Maintenance Technician	29,426	0.333
CE5642	-----	Central Office Exchange Technician	18,703	0.364
RM2304	-----	Intermediate Radio Operator	9,980	0.430
RM2305	-----	DCS Satellite Communication Terminal Operator (AN/MSC-46 and/or AN/TSC-54)	8,289	0.164
RM2345	0000	Teletype (AN/UGC-20/25) Repairman	14,003	0.194
RM2393	-----	Special Fixed Communication System Operator	9,942	0.177
RM2342	48JA	Teletype (MOD 28, UGC-G and UGC-20) Repairman	11,176	0.172
RM2346	48JA	Low Level Keying Teletype Operator	10,906	0.143
RM2318	RM48MA	Communications System Technical Operator	18,262	0.129
CE5644	-----	Cable Splicing Technician	19,426	0.364
CT1598	CTM481B	Precision Measuring Equipment Technician	27,916	0.496
DS1615		Shipboard Tactical Data Systems Technician	36,885	0.226
DS1616		Data Display Equipment Maintenance Technician	27,154	0.351
DS1617		Data Transmission Terminal Equipment Maintenance Technician	24,356	0.465
DS1618		Data Correlation and Transfer System	24,705	0.190
DS1636		AN/UYK-4 (V) Computer System Maintenance Technician	25,382	0.140
ET1534	ET1404	Communications (Tropo Scatter) Technician	29,575	0.170
ET1525	ET1405	Communications Equipment (AN/FRT-39, AN/URT-19 and AN/URA-30)	25,792	0.285
ET1526	ET1406	Communications Equipment (AN/FRR-60 Radio Receiver & CU-1382 or Multicoupler) Technician	25,792	0.309
ET1527	ET1407	Communications Equipment (AN/FTA-15 & AN/FGC-60) Technician	25,792	0.275

*Cost is FY72 data inflated to FY79 and includes basic costs, cost of NEC courses and NEC field courses if required.

TABLE 12 (CONTD)

<u>NEC</u>	<u>New NEC</u>	<u>Title</u>	<u>Training Cost*</u>	<u>RTR</u>
ET1528	ET1408	Communications Equipment (AN/FRC-84 and ECC-170) Technician	25,792	0.337
ET1411		Digital Subscriber Terminal Equipment Maintenance Technician	19,046	0.410
ET1531	ET1402	Communications Equipment (AN/FRT-24A)	25,792	0.234
ET1532	ET1421	Communications Equipment (AN/WRT-2) Technician	25,896	0.161
ET1536	ET1423	Communications Equipment (AN/SRC 20/21 and AN/URC 2) UHF	25,896	0.334
ET1537	ET1403	Communications Equipment AN/FRT-83-84-85 Technician	31,507	0.325
ET1541	ET48JI	ET1431 Communications security Devices Equipment (KY-8) Technician	26,270	0.209
ET1542	ET48JI	ET1436 Communications Security Devices Equipment (KG-14, KN-37R) Technician	28,630	0.251
ET1546	ET48JK	ET1448 Communications Security Devices Equipment (KY-3) Technician	25,214	0.150
ET1548	ET48JH	ET1432 Communications Security Devices Equipment (KW-37R, KW-7) Technician	25,729	0.368
ET1549	ET48JH	ET1432 Communications Security Devices Equipment (KW-37T) Technician	26,740	0.222
ET1557	ET1426	Communications Equipment Tactical Data Systems AN/SRC-16/17/23/31)	29,896	0.200
ET1559	ET48JN	ET1449 NBST Equipment Technician	31,282	0.340

*Cost is FY72 data inflated to FY79 and includes basic costs, cost of NEC courses and NEC field courses if required.

5.0 BASIC AND SPECIALIZED TRAINING COSTS - U. S. AIR FORCE

5.1 General

This section provides cost data and rationale for the calculation of training costs for selected Air Force military personnel. The following elements are included: accession costs, basic training costs, and Air Force Specialty Codes (AFSC) training costs. All of these elements are included in Table 13. Table 13 contains cost data and RTR information for those AFSCs that may operate or maintain equipment developed under the TRI-TAC Program. The total annual replacement training cost is calculated by multiplying the AFSC training cost by the RTR.

5.2 Detailed Explanation of Table 13

5.2.1 Acquisition Costs : Airmen

The USAF defines acquisition costs as the estimated cost of bringing an individual from civilian life to this first duty station. The acquisition cost of \$3755 is a composite of the average cost of recruiting, accession travel (i.e., one-way cost to an initial training base or civilian institution), TDY (i.e., per diem paid to trainees enrolled in courses of less than 20 weeks duration), initial clothing, education/training, student pay and allowances, and miscellaneous allowances. Additionally, the costs are unique to the acquisition phase only. Additional training is required before an AFSC is attained.

5.2.2 Cost by Selected Air Force Specialty Code (AFSC)*

Costs by AFSC are shown in Table 13. Included in the AFSC costs are:

1. The cost per graduate for training courses required for a specific AFSC.
2. The acquisition cost which includes the costs of recruiting, initial travel, initial clothing issue, and training at the Air Force Military Training Center.

* Source: USAF Cost & Planning Factors, Reference 8.9.

3. Pay and allowances while in pretechnical training status (PTTS). Standard pay and allowances for approximately 10 days are included except where no formal training is required.
4. A PCS cost for each AFSC at completion of training at the Military Training Center when no formal training is required or when an airman goes directly to his first duty station. An additional PCS move is included if the career progression includes going from lateral fields to formal training and the formal training is longer than 19 weeks. If the formal training is less than 19 weeks, TDY travel and per diem costs are included.
5. Capital investment costs (less depreciation) for equipment, real property, and inventories.
6. Estimated costs for OJT at the "5" skill level or "3" skill level have been included for all specialties.

5.2.3 Replacement Turnover Rate - USAF (Reference 8.15)

RTRs are shown in Table 13. The RTR is an annual rate for the entire sample population as follows:

Let

- R = overall replacement rate
- n = number of non-losses
- l = number of losses
- c = course length in months
- u = average useful life for losses in months

Then,

$$R = \frac{12 (n+1)}{n(120-c) + lu}$$

Calculations are based upon a 40 percent sample of the enlisted force. The average life for losses is calculated by accumulating total active service in months for the loss population and dividing by the population size. The average useful life is the average life minus the training course length. Statistics include both losses and non-losses aggregated over the first through tenth years of service.

If the analyst is required to determine the RTR for an AFSC not shown in Table 13, a factor of 0.126 may be used. This factor is the average of all the RTRs in Table 13.

TABLE 13

U. S. AIR FORCE TRAINING COSTS
BY AFSC - FY79

<u>AFSC</u>	<u>TITLE</u>	<u>TRAINING COST*</u>	<u>RTR **</u>
27450	Command & Control Technician	13,409	.1051
29150	Communications Center Specialist	15,723	.1256
29353	Ground Radio Operator	12,103	.1272
29550	Auto Digital Switching Technician	31,017	.1148
30450	Radio Relay Equipment Repairman	27,233	.1321
30454	Ground Radio Communications Equipment Repairman	26,273	.1278
30456	Satellite Communication Terminal Opr. Repairman	20,621	.1121
30554	Space Systems Command & Control Equipment Opr. & Tech.	26,178	.1235
30650	Electronic Communications & Crypts Repairman	27,403	.1632
30651	Electronic Mech. Communications & Crypts System Repairman	26,933	.1632
30750	Telecommunications System Control SPEC/ Attendant	20,230	.1213
32850	Aircraft Radio Repairman	23,129	.1254
36150	Outside Wire and Antenna Maintenance	20,149	.1273
36154	Cable Splicing Specialist	17,818	.1208
36251	Phone Switching Equipment, Electro/ Mechanical	28,730	.1440
36252	Electronic Switching System Repairman	29,236	.1154
36254	Phone Equip Installer Repairman	19,160	.1273
36350	Communications & Relay Equipment Repairman Electro/Mechanical	20,245	.1240
51150	Computer Operator	14,018	.1161
53550	Corrosion Control Specialist	12,265	.1225
54550	Refrigerator and Air Conditioning Specialist	20,928	.1268

*Cost is FY75 data inflated to FY79 and includes cost of acquisition, basic course, and AFSC producing costs.

**Replacement Turnover Rates shown are for 1974 data.

6.0 BASIC AND SPECIALIZED TRAINING COSTS - U. S.
MARINE CORPS

6.1 General

This section provides cost data and rationale for the calculation of training costs for Marine Corps military personnel. The following elements are included: accession costs, recruit training costs, individual combat training costs, and Military Occupational Specialty (MOS) training costs. Table 14 contains training costs and RTR information for those MOSs that may operate or maintain equipment developed under the TRI-TAC Program. The total annual replacement training cost is calculated by multiplying the MOS training costs by the RTR.

6.2 Detailed Explanation of Table 14

6.2.1 Cost of MOS Training (Reference 8.11)

The cost per student by course, shown in Table 14, reflects the direct cost of operating the course such as instructional staff, operating expenses for equipment, maintenance of equipment, expendable supplies, pay and allowances based on composite standard rates provided by the Navy Comptroller, travel and per diem if appropriate, and the indirect costs of base overhead appropriate to the level of activity of the course in relation to all activities on the base. Recruit training and individual combat training costs estimated at \$6,058 are included in Table 14.

6.2.2 Replacement Turnover Rate - Marine Corps (Reference 8.14)

The USMC RTRs shown in Table 14 were derived as follows:

$$R = \frac{1}{\text{EAV} - \text{Tng. Time}}$$

where EAV is the expected average length of service and Tng. time is the amount of time spent in recruit and MOS training. For example, entry level personnel with an MOS 2511 have an EAV of 2.87 years and spend 0.0769 years in recruit and MOS training. The marine is, therefore, available for duty 2.792 years and the RTR for the 2511 MOS is 0.358.

If the analyst is required to determine the RTR for an MOS not shown in Table 14, an RTR of 0.433 may be used. This factor is the average of the known RTRs shown in Table 14.

TABLE 14

U. S. MARINE CORPS TRAINING COSTS
BY MOS - FY79

<u>MOS</u>	<u>TITLE</u>	<u>TRAINING COST*</u>	<u>RTR ***</u>
2511	Wireman	6,734**	.358
2519	Wire Chief	11,545	-
2531	Field Radio Operator	8,315	.399
2532	Microwave Equipment Operator	9,256	.373
2534	HF Communications Central Operator	8,315	-
2537	Radio Chief	14,342	-
2542	Communications Center Man	8,773	.373
2549	Communications Center Chief	11,544	-
2591	Operational Communications Chief	13,166	-
2811	Telephone Technician	9,594	.390
2813	Cable Systems Technician	9,594	-
2814	Central Office Installer/Repairman	9,594	.490
2818	Teletype Technician	8,621	.402
2825	Fixed Ciphony Technician	8,588	.623
2826	Digital Subscriber Terminal Equipment Technician	8,588	.562
2827	Mobile Communications Central Technician	8,588	.307
2828	KW-26 Terminal Technician	8,588	.562
2829	Mobile Communications Central Technician	22,220**	.283
2831	Microwave Equipment Repairman	8,175	.407
2841	Ground Radio Repairman	12,566	.429
2851	Aviation Radio Repairman	15,142	-
2853	Aviation Meteorological Equipment Repairman	15,142	-
2861	Radio Technician	25,201	-
2866	Aviation Radio Technician	28,245	-
2871	Electronic Instrument Repairman	13,285	.544
2872	Electronic Calibration Technician	13,285	-

* Costs are 1976 figures inflated to FY79 and include the cost of accession and direct training costs.

** These costs are 1970 figures inflated to FY79 and include accession and direct training costs.

*** Replacement Turnover Rates shown are for 1974 data.

- 8.0 REFERENCES
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- 8.7 DA (Comp.), "Military Occupational Specialty Training Cost Handbook (MOSB)," May 1974.
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