

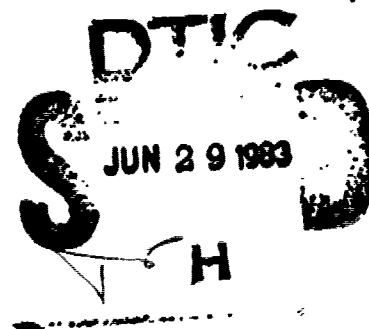
Research Note 83-29

Estimating The Manpower, Personnel, And Training Requirements Of The Army's Corps Support Weapon System Using The HARDMAN Methodology

APPENDICES

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**ARMY RESEARCH INSTITUTE
FORT SILL, OKLAHOMA, FIELD UNIT**



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Alternatives and Tradeoff Analysis	Manpower Cost and Readiness Drivers													
Comparative Analysis	Manpower Support: In...													
Field Artillery Systems	Support System Standardization													
Functional Requirements Identification	Task Description													
Human Resources in LCSMM	Training Device Requirements													
Logistics Analysis	Training Requirements Estimation													
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) > The HARDMAN methodology is designed to assess the human resource requirements of emerging weapons systems. The goal of this project was to examine the manpower, training and personnel demands of the Army's conceptual Corps Support Weapons System (CSWS), an indirect missile system capable of long-range interdiction missions. The project examined three alternative system configurations and compared them to a composite reference system. Steps 1 through 5 of the methodology were applied. The results of the project indicated that the multiple launch, tracked vehicle alternative was preferred from a manpower, personnel and training standpoint. Further information may be developed for the CSWS Special Task Force as required.														

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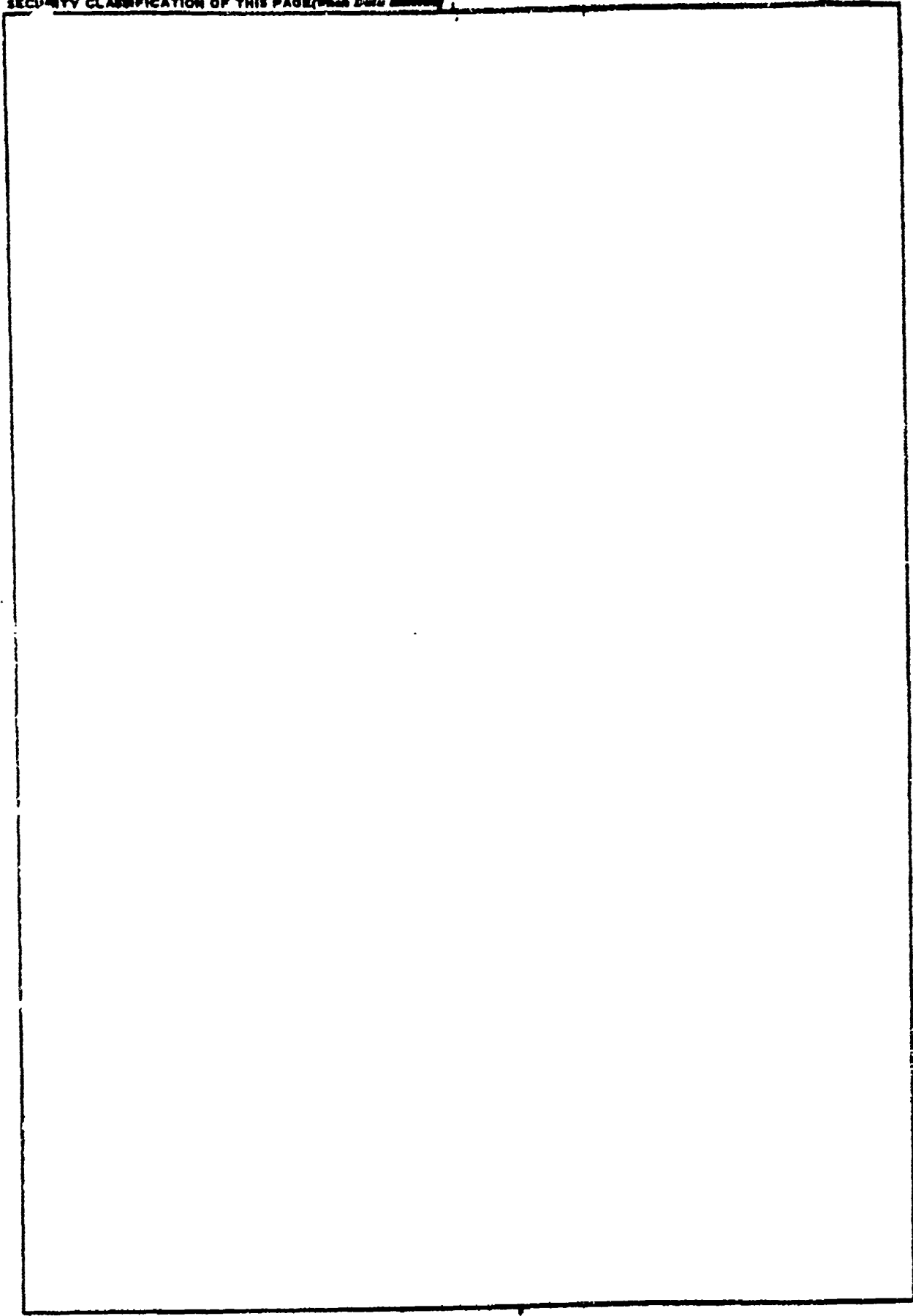
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APPENDIX A
CONSOLIDATED DATA BASE



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APPENDIX A1
SYSTEM FUNCTIONAL REQUIREMENTS

TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

SYSTEM CSWS

FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB-FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
OPERATE CSWS	Intelligence	Acquire target	Search and detect target Identify target				Delay enemy Disrupt enemy Destroy enemy Continuous	Target density
				Time: Duration	Increase	Continuous		24 hour operation
				Mission response	Reduce			Target density
				Target servicing rate	Increase		Keep target in central battle to a manageable number	
				Range	Increase	300KM max	300KM max	
				Range	Increase			
				Range	Increase			
				Accuracy		% correct		Deep indirect fire systems Command and control sites Air defense sites Radar sites Logistic and support sites Combar power moving to central battle • Hard armor • Medium armor • Soft
				Time		Real time data	Hit target	Mobility Enemy location
				Frequency	Increase			
	Communicate	Assess terminal effects	Determine target location Predict future target location Observe/evaluate effects Assess accuracy Determine aiming correction	Accuracy	Increase	P of hit		
				Accuracy	Increase	P of hit		
				Time				
				Accuracy	Increase			
				Time				
				Accuracy	Increase	P of hit	Hit target	
				Range	Increase	KM		Target density
				Speed	Increase			Mobility
				Volume	Increase			Target location
				Transmit information				



TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

SYSTEM CSWS

FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB-FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
OPERATE CSWS (continued)	Communicate (continued)	Transmit information	Content e.g., • Transmit target data • Transmit tactical fire order					Target density Mobility Target location
			Format e.g., • Voice • Print • Data					
			Medium e.g., • FM • AM • SSB • Laser					
			Content e.g., • Receive tactical fire order • Receive MET data					
			Format e.g., • Voice • Print • Data • Video					
			Medium e.g., • Television • Laser • Micro Wave					
				Time: Mission response Target servicing Analysis Accuracy	Reduce Increase Reduce	minute targets per day Minutes		
				Time: Response time Quantity	Reduce Increase	minutes simultaneous targets		
			Compile target data base Define and select candidate targets Prioritize targets Dispose of non-selected targets	Accuracy			Maximum damage to enemy tactical position/ strength	Target type Tactical situation Target density
	C2	Analyze target data						



TABLE A11. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB-FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
OPERATE CSWS (continued)	C2 (continued)	Perform tactical fire control		Time: Mission response Target servicing Analysis Accuracy	Reduce Increase Reduce			Target density
			Validate target data	Accuracy				
			Determine level of attack					
			Design (tailor) attack					
			Determine munitions					
			Select fire units					
			Validate tactical fire order				Maximum damage to enemy tactical position/strength with least resource expenditure	Target size Target composition Tactical situation
				Time: Mission response Target servicing Analysis Accuracy	Reduce			Target density Target location Target movement Target composition ● Hard armor ● Medium armor ● Soft
			Compute standard conditions - Standard MET - Standard position - Standard material	Accuracy	Increase	Error	Hit target	
			Compute non-standard corrections - MET - Earth rotation - Gravity vector - Drift - Position - Observed	Time Accuracy	Reduce	P of hit		
			Compute firing solution - Range - Azimuth of fire - Orienting angle - Sustainer cutoff - Range factors - Fuze setting - Quadrant elevation - Aim time - Time to fire - Time of flight	Time Accuracy	Reduce	P of hit		



TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

SHEET 4 of 7

FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
OPERATE CSWS (continued)	Shoot	Prepare the weapon for firing		Time: Rate of fire Range Accuracy	Increase Increase	150-200KM Error	Hit target	Distance Target location Target type
				Time Accuracy	Reduce Increase	Error	Error	
			Determine weapon location					
			Determine weapon direction					
		Aim weapon	Determine weapon attitude					
			Determine no-standard conditions					
			Set elevation	Time Accuracy	Reduce Increase		Hit target	
			Set deflection					
			Compensate for side slope			8-10 degree side slope		
		Load a launcher	Validate weapon preparation					Target density
			Select projectile	Time	Reduce	minutes per round		Target type
			Load projectile					
			Fire weapon	Time	Reduce	minutes	Hit target	Target location Target density
		Launch projectile	Re-establish initial weapon state					
			Adjust projectile flight	Time Accuracy Dud rate		Real time Error P of dud		
				TIME: Accuracy	Reduce Increase			Enemy mobility Enemy density
	Navigate on Land	Determine location data	Determine own location					
			Determine destination					
			Determine restricted areas					



TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

SYSTEM FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
OPERATE CSWS (continued)		Determine/update travel data	Determine travel route					
			Determine travel distance					
			Determine travel heading					
			Determine travel speed					
			Determine fuel consumption					
	Survive threat environment	Displace CSWS	Determine arrival time					
			Speed, Time	Reduce		KM/Hr	Reduced vulnerability	Mobility
			Distance	Increase		KM		Counterfire capability
			Range	Increase				
			Time	Reduce				
	Survive threat environment	Move CSWS to new location	Speed, Time	Reduce		KM/Hr		Threat intensity
			Distance	Increase				Enemy detection capability
			Time	Reduce				Enemy munitions
			Availability	Increase		P of mission completion	Reduced vulnerability	
			Detection			P of mission completion	Reduced vulnerability	
	Protect CSWS against enemy munition	Protect CSWS against enemy munition	Availability			P of mission completion	Reduced vulnerability	
			Protect against conventional					
			Protect against nuclear					
			Protect against chemical					
	Protect electronics against EW	Protect electronics against EW	Protect against biological					Enemy EW capability
			Protect against disruption			P of mission completion	Reduced vulnerability	
			Protect against interception					
	Protect CSWS against ground attack	Protect CSWS against ground attack				P of mission completion	Reduced vulnerability	Enemy ground forces



TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS										
FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB-FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION		
OPERATE CSWS (continued)	Protect CSWS against hazardous conditions	Protect CSWS against fires		Time			Reduced accident rate	Enemy firepower		
			Detect fire	Time	Decrease					
			Extinguish fire	Time	Decrease					
		Protect prefire safety	Check weapon safety	Accuracy		100%				
			Check target area safety	Accuracy		100%				
SUPPORT CSWS	Supply Material	Supply Subst. (Class I)					Sustained Operation	Target Density 24 Hour Operation		
			Supply Misc. (Class II)							
			Supply POL (Class III)							
		Receive POL	Volume							
			Time							
		Store POL	Volume							
		Supply construction (Class IV)								
			Supply Ammunition (Class V)							
		Supply Class VI			Receive ammunition	Quantity				
			Supply Class VII		Store ammunition	Quantity				
			Supply Class VIII							
			Supply Class IX							
	Perform Services	Perform Maintenance services						Improved availability		
			Perform preventive maintenance	Time: Frequency	Increase	MTBF				
				Induced failures	Decrease	Induced failures				
				Maint. man. hours		MMH				
				Accuracy						
			Failure Identification	Increase	100% incipient failure detection					
Perform corrective maintenance	Time: MT/R	Decrease	MTTR							
	MMH	Decrease	MMH							
	Frequency	Decrease	MTBF							
	Accuracy	Increase	Inherent failures							
Perform transportation Services	Correct failure detections	Increase	100% incipient failure detection							





TABLE A1-1. SYSTEM FUNCTIONAL REQUIREMENTS ANALYSIS WORKSHEET.

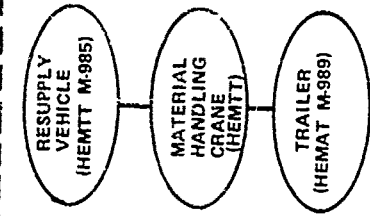
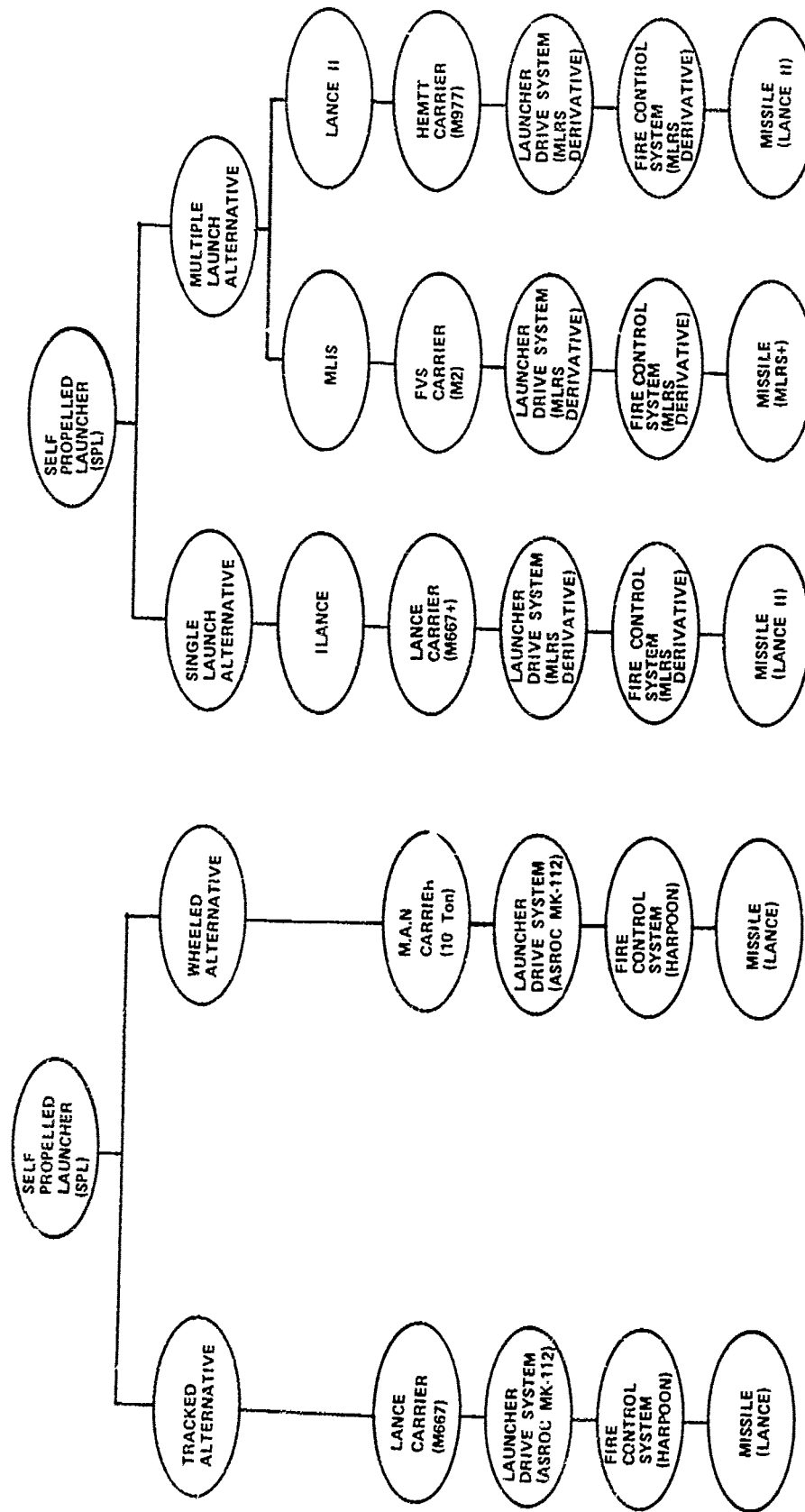
SYSTEM CSWS	FUNCTIONAL AREA	SYSTEM FUNCTION	SYSTEM SUB-FUNCTION	FUNCTIONAL ELEMENT	MEASURE	IMPROVEMENT	PERFORMANCE STANDARD	OUTCOME	THREAT CONDITION
SUPPORT CSWS (continued)	Perform Services (continued)	Perform transportation services	Perform administrative services	Deploy system	Time			Sustained operation	Target density 24 hour operation
SUPPORT CSWS (continued)	Perform Services (continued)	Perform food services	Perform laundry services	Perform personnel services	Time			Sustained operation	Target density 24 hour operation
SUPPORT CSWS (continued)	Perform Services (continued)	Perform training services	Develop force structure	Perform financial services	Time			Sustained operation	Target density 24 hour operation

APPENDIX A2
ENGINEERING ANALYSES

Figure A2.1. CSWS System Description.

REFERENCE

BASELINE



- Configuration: IL - Improved LANCE. Single launch alternative (1 LANCE II Missile, 3 Missiles).
- MLIS - Multiple Launch Interdiction System (3 Missiles).
- LANCE II - Multiple Launch Alternative (3 LANCE II Missiles).
- FVS - Fighting Vehicle System.
- HEMTT - Heavy Expanded Mobility Tactical Truck.
- MLRS - Multiple Launch Rocket System.

APPENDIX A.2.2

Reference and Baseline Equipment Configuration Lists

Table A2.2-1. Reference System Self-Propelled
 Launcher-Tracked Version (M752)
 (Lance M667 Carrier)

Functional

Group Code

System Subsystem Nomenclature

01	Engine (Detroit Diesel 6V53/212HP)
0101	Engine Block
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Not Applicable
03	Fuel System
0301	Fuel Tank Assembly (85 gal.)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor
04	Exhaust System
0401	Exhaust Manifold
0402	Muffler

05	Cooling System
0501	Radiator
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Heater Assembly (Cold weather Starting)
0505	Transmission Oil Cooler
06	Electrical System (24 volt)
0601	Alternator/Generator (Leece-Neville/100 amp)
0602	Battery
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges & Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
07	Transmission (Allison TX100-1)
0701	Torque Converter
0702	Transmission Assembly
0703	Oil Filter and Screen

08	Transfer and Final Drive Assembly
0801	Transfer Gearcase
0802	Power Take-Off Assembly
09	Shafts
0901	Propeller and Propeller Shafts
0902	Final Drive Assembly
10	Not Applicable
11	Differential
1101	Right Angle Gearbox
1102	Oil Pump and Filter
1103	Oil Cooler
12	Not Applicable
13	Tracks
1301	Sprocket Drive
1302	Track Assembly
14	Steering System
1401	Steering Unit

15	Towing System
1501	Towing Hook and Pintel Assembly
16	Suspension System
1601	Torsion Bar
1602	Suspension Lock-out Cylinder
17	Not Applicable
18	Hull Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Steering Brake Control Assembly
1806	Cab and Power Plant Access Doors
1807	Personnel Heater System
1808	Instrument Panel
1809	Sump Pump
19	Not Applicable
20	Not Applicable
21	Not Applicable

22	Body Chassis
2201	Frame Assembly
2202	Floor Plates
2203	Swim Vanes
2204	Ramp
23	Environmental Control System
2301	Positive Pressure Equipment
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment (M11, M13, M258)
2304	Fire Suppression System
24	Communications System
2401	VHF-FM Radio Set (ARC-131)
2402	COMSEC VHF Unit (KY-28)
2403	Intercom Set (AIC-14)
2404	Digital Data Communications Set (ASW-25)
25	Navigation System
2501	Inertial Navigation Set (ASN-92)
2502	Attitude Heading Reference Set (ASN-107)
2503	Barometric Altimeter (AAU-19)
2504	Distance Transmitter Unit

26	Missile Support Assembly (LANCE)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support Assembly
27	Not Applicable
28	Not Applicable
29	Not Applicable
30	Launch Fixture (LANCE)
3001	Base Frame Assembly
3002	Traverse Frame Assembly
3003	Launch Truss Assembly
31	Launcher Drive System (ASROC, MK-112)
3101	Not Applicable
3102	Not Applicable
3103	Receiver-Regulators
3104	Hydraulic System
3105	Manual Hydraulic Hand Pump
3106	Control and Power System
3107	Not Applicable

3110	Train and Elevate Air Drive Motors and Lubricators
3111	Train and Elevate Bufrer Systems
32	Fire Control System (HARPOON)
3201	Communications Processor (OW-79)
3202	Launch Control Set (SWG-1)
3223	Fire Control Unit
3205	Weapon Control Indicator Panel
3206	Abney Level
3207	Test Set Simulator (TS-3632)
33	Missile Round (LANCE)
3301	Warhead Section
3302	Missile Main Assemblage
34	Missile Shipping and Storage Container (M599)
3401	Shell Assemblies
3402	Skids

Table A2.2-2. Reference System Self Propelled
Launcher-Wheeled Version

(Maschinenfabrik Augsburg Nurnberg (M.A.N.) 10 Ton Carrier)

Functional

Group Code

System Subsystem Nomenclature

01	Engine (Model D2840, V-10)
0101	Engine Block
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Clutch (ZF 400)
0201	Clutch Assembly
03	Fuel System
0301	Fuel Tank Assembly (105 gal.)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor

04	Exhaust System
0401	Exhaust Manifold
0402	Muffler
05	Cooling system
0501	Radiator
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Filter Assembly
0505	Transmission/Converter Oil Cooler
06	Electrical System (24v)
0601	Alternator/Generator
0602	Battery (4 each, 12 vclt)
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Trailer Electrical Connector Assembly
07	Transmission (ZF 45-150GP, 8-SPEED)
0701	Torque Convertor

0702	Transmission Assembly
0703	Oil Filter and Screen
08	Transfer and Final Drive (ZP 150 GPA)
0801	Transfer Gearcase
0802	Power Take-Off Assembly
09	Shafts
0901	Drive Shaft Assembly
0902	Final Drive Assembly
10	Front Axle Assembly
1001	Differential
11	Rear Axle Assembly
1101	Differential
12	Brake System
1201	Service Brakes
1202	Parking Brakes
1203	Brake Drums
13	Wheels
1301	Tires

14	Steering System
1401	Power Steering Assembly
1402	Steering Shaft
15	Towing System
1501	Towing Hook and Pintel Assembly
1502	Trailer Tow Assembly
16	Suspension System
1601	Spring Assembly (Coil)
1602	Shock Absorber Assembly
17	Not Applicable
18	Body and Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Brake Pedal Assembly
1806	Doors
1807	Heater and Ducting
1808	Instrument Panel
1809	Second Unit Body

19	Not Applicable
20	Not Applicable
21	Not Applicable
22	Body Chassis
2201	Fenders
2202	Bumpers
2203	Stowage Compartment
2204	Spare Tire Stowage Assembly
2205	Service and Air Brake Connector
2206	Slave Start Connector
23	Environmental Control System
2301	Positive Pressure Equipment
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment
2304	Fire Suppression System
24	Communications System
2401	VHF-FM Radio Set (ARC-131)
2402	COMSEC Unit (KY-28)
2403	Intercom System (AIC-14)
2404	Digital Data Communications Set (ASW-25)

25	Navigation System
2501	Y-1 Navigation Equipment (ASN-92)
2502	Attitude Heading Reference Equipment (ASN-107)
2503	Barometric Altimeter (AAU-19)
2504	Distance Transmitter Unit
26	Missile Support Assembly (LANCE)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support
27	Not Applicable
28	Not Applicable
29	Not Applicable
30	Launch Fixture (LANCE)
3001	Base Frame Assembly
3002	Traverse Frame Assembly
3003	Launch Truss Assembly

31	Launcher Drive System (ASROC, MK-112)
3101	Not Applicable
3102	Not Applicable
3103	Receiver-Regulators
3104	Hydraulic System
3105	Manual Hydraulic Hand Pump
3106	Control and Power System
3107	Not Applicable
3108	Heating and Cooling System
3109	Not Applicable
3110	Train and Elevate Air Drive Motors and Lubricators
3111	Train and Elevate Buffer Systems
32	Fire and Control System (HARPOON)
3201	Communications Processor (OW-79)
3202	Launch Control Set (SWG-1)
3203	Fire Control Unit
3204	Casualty Panel (C-10277)
3205	Weapon Control Indicator Panel
3206	Abney Level
3207	Test Set Simulator (TS-3632)

33	Missile Round (LANCE)
3301	Warhead Section
3302	Missile Main Assemblage
34	Missile Shipping and Storage Container (M599)
3401	Shell Assemblies
3402	Skids

Table A2.2-3. Reference System Resupply Vehicle
(Maschinenfabrik Augsburg Nurnberg (M.A.N.) 10 Ton Truck)

Functional <u>Group Code</u>	<u>System/Subsystem nomenclature</u>
01	Engine (Model D2840, V-10)
0101	Engine Block
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Clutch (ZF 400)
0202	Clutch Assembly
03	Fuel System
0301	Fuel Tank Assembly (105 gal.)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor
04	Exhaust System
0401	Exhaust Manifold
0402	Muffler

05	Cooling System
0501	Radiator
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Heater Assembly (Cold Weather Starting)
0505	Transmission/Converter Oil Cooler
06	Electrical System (24V)
0601	Alternator/Generator
0602	Battery (4 each, 12 volt)
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Trailer Electrical Connector Assembly
07	Transmission (ZF 4S-150GP, 8-SPEED)
0701	Torque Converter
0702	Transmission Assembly
0703	Oil Filter and Screen

08	Transfer and Final Drive (ZP 150 GPA)
0801	Transfer Gearcase
0802	Power Take-Off Assembly
09	Shafts
0901	Drive Shaft Assembly
0902	Final Drive
10	Front Axle Assembly
1001	Differential
11	Rear Axle Assembly
1101	Differential
12	Brake System
1201	Service Brakes
1202	Parking Brakes
1203	Brake Drums
13	Wheels
1301	Tires
14	Steering System
1401	Power Steering Assembly
1402	Steering Shaft

15	Towing System
1501	Towing Pintel Assembly
1502	Trailer Towing Assembly
16	Suspension System
1601	Spring Assembly (Coil)
1602	Shock Absorber Assembly
17	Not Applicable
18	Body and Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Brake Peddle Assembly
1806	Doors
1807	Heater and Ducting
1808	Instrument Panel
1809	Second Unit Body
19	Not Applicable

20	Winch and Crane System
2001	Material Handling Crane (8-ton)
2002	Hydraulic Power Package Assembly
21	Not Applicable
22	Body Chassis
2201	Fenders
2202	Bumper
2203	Stowage Compartment
2204	Spare Tire Stowage Assembly
2205	Service and Air Brake Connector
2206	Slave Start Connector
23	Environmental Control System
2301	Positive Pressure Equipment
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment
2304	Fire Suppression System
24	Communications System
2401	VHF-FM Radio Set (ARC-131)
2402	COMSEC Unit (KY-28)
2403	Intercom Set (AIC-14)

25	Not Applicable
26	Missile Support Assembly (Note 1)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support Assembly

NOTES:

1. Required on the RSV because the missile carried on the RSV will be uncanistered, fully assembled, ready-to-fire rounds.

Table A2.2-4. Baseline System Self-Propelled Launcher
(Tracked Version - Improved Lance)

<u>Functional Group Code</u>	<u>System/subsystem Nomenclature</u>
01	Engine (Detroit Diesel 6V53)
0101	Engine Block
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Not Applicable
03	Fuel System
0301	Fuel Tank Assembly (85 gal.)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor
04	Exhaust System
0401	Exhaust Manifold
0402	Muffler

05	Cooling System
0501	Radiator
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Heater Assembly (Cold weather Starter)
0505	Transmission Oil Cooler
06	Electrical System (24V)
0601	Alternator/Generator (Leece-Neville 100 amp)
0602	Battery
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Not Applicable
0610	Diagnostic Connector Assembly (STE/ICE)
07	Transmission (Allison TX-100-1)
0701	Torque Converter
0702	Transmission Assembly
0703	Oil Filter and Screen

08	Transfer and Final Drive Assembly
0801	Transfer Gearcase
0802	Power Take-Off Assembly
09	Shafts
0901	Propeller and Propeller Shafts
0902	Final Drive Assembly
10	Not Applicable
11	Differential
1101	Right Angle Gearbox
1102	Oil Pump and Filter
1103	Oil Cooler
12	Not Applicable
13	Tracks
1301	Sprocket Drive
1302	Track Assembly
14	Steering System
1401	Steering Unit

15	Towing System
1501	Towing Hook and Pintel Assembly
16	Suspension System
1601	Torsion Bar
1602	Suspension Lock-Out Cylinder
17	Not Applicable
18	Hull Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Steering Brake Control Assembly
1806	Cab and Power Plant Access Doors
1807	Personnel Heater System
1808	Instrument Panel
1809	Sump Pump
19	Not Applicable
20	Not Applicable

21	Not Applicable
22	Body Chassis
2201	Frame Assembly
2202	Floor Plates
2203	Swim Vanes
2204	Ramp
23	Environmental Control System
2301	Hybrid Collective Protection Equipment (HCPE)
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment (M11, M13, M250)
2304	Fire Suppression System (Halon 1301)
24	Communications System
2401	VHF-FM Radio Set (SINCGARS, VRC-()4)
2402	COMSEC Unit (Vandal, KYV-4)
2403	Intercom Set (VIC-1)
2404	Digital Data Communications Set (PLRS, VSQ-1)
25	Navigation System
2501	Inertial Navigation Set (USQ-70)

2502	Attitude Heading Reference Set (LR-80)
2503	Not Applicable
2504	Distance Transmitter Unit
26	Missile Support Assembly (LANCE)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support Assembly
27	Not Applicable
28	Not Applicable
29	Not Applicable
30	Launch Fixture (LANCE)
3001	Base Frame Assembly
3002	Traverse Frame Assembly
3003	Launch Truss Assembly
31	Launcher Drive System (MLRS Derivative)
3101	Not Applicable
3102	Not Applicable
3103	Position Monitors
3104	Hydraulic System

3105	Manual Back-Up System
3106	Power System
3107	Power Distribution Box
3108	Heat Exchanger
32	Fire Control System (MLRS Derivative)
3201	Communications Processor
3202	Electronics Unit
3203	Fire Control Unit
3204	Remote Fire Unit
3205	Fire Control Panel
3206	Abney Level
3207	Short-No Voltage Tester
3208	Test Set-Simulator (Organizational)
3209	Test Set-Simulator (Direct Support)
3210	Maintenance Kit (Organizational)
3211	Maintenance Kit (Direct Support)
33	Missile Round (LANCE II)
3301	Warhead Section
3302	Missile Main Assemblage
34	Missile Canister (Shipping and Storage)
3401	End Closures
3402	Storage Tube
3403	Shock Mitigating System
3403	Lift Mechanism

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Table A2.2-5. Baseline System Self-Propelled Launcher
(Tracked Version - Multiple Launch Interdiction System)

Functional <u>Group Code</u>	<u>System/Subsystem Nomenclature</u>
01	Engine (Cummins - VTA 903)
0101	Engine Block
0102	Starter
0103	Lubricating System
0104	Air Induction System (2 stage)
02	Not Applicable
03	Fuel System
0301	Fuel Tank (175 gallons)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor
04	Exhaust System
0401	Exhaust Manifold
0402	Muffler

05	Cooling System
0501	Radiator
0502	Coolant Pump
0503	Expansion Tank
0504	Coolant Heater Assembly (Cold Weather Starting)
0505	Transmission Oil Cooler
06	Electrical System (12 volt)
0601	Alternator/Generator (220 amp)
0602	Battery (4 each, 100 amp)
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Not Applicable
0610	Diagnostic Connector Assembly (STE/FMC)
07	Transmission (DDA A300-6)
0701	Torque Convertor
0702	Transmission Assembly
0703	Oil Filter and Screen

08	Transfer and Final Drive
0801	Transfer Gearcase
0802	Power Take-Off Assembly
09	Driveline/Shafts
0901	Drive Shaft Assembly
0902	Final Drive Assembly
10	Not Applicable
11	Not Applicable
12	Brake System
1201	Service Brakes
1202	Parking Brakes/ Hand Brakes
13	Tracks
1301	Roadwheel Assembly
1302	Shock Absorber Assembly (4 each per side)
1303	Track Shoes (83L, 82R)
14	Steering System
1401	Steering Unit

15	Towing System
1501	Towing Pintel Assembly
16	Suspension System
1601	Spring Assembly
1602	Linear Shock Assembly
1603	Disk Brake Suspension (Lock-Out)
1604	Integrated Hydraulic Actuator
1605	Rear Idler Wheel
1606	Return Roller Suspension
17	Not Applicable
18	Hull
1801	Windshield (W/Louvered Armor)
1802	Not Applicable
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Steering Brake Control Assembly
1806	Cab and Power Plant Access Door Assemblies
1807	Personnel Heater System
1808	Instrument Panel
19	Not Applicable

20	Not Applicable
21	Not Applicable
22	Body Chassis
2201	Frame Assembly (Front and Rear)
2202	Floor Plates
23	Environmental Control System
2301	Hybrid Collective Protection System (HCPE)
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment (M11, M13, M258)
2304	Fire Suppression System (Halon 1301)
24	Communications System
2401	VHF-FM Radio Set (SINGARS, VRC-C)4)
2402	COMSEC Unit (vandal, KYV-4)
2403	Intercom Set (VIC-1)
2404	Digital Data Communications Set (PLRS, VSQ-1)

25	Navigation System
2501	Inertial Navigation Set (USQ-70)
2502	Attitude Heading Reference Set (LR-80)
2503	Not Applicable
2504	Distance Transmitter Unit
26	Not Applicable
27	Not Applicable
28	Not Applicable
29	Not Applicable
30	Launch Fixture
3001	Base Assembly
3002	Not Applicable
3003	Turret Assembly
3004	Canister Launcher Platform
3005	Missile Canisters
31	Launcher Drive System (MLRS Derivative)
3101	Not Applicable
3102	Not Applicable
3103	Position Monitor

3104	Hydraulic System
3105	Manual Back-Up System
3106	Power System
3107	Power Distribution Box
3108	Heat Exchanger
32	Fire Control System (MLRS Derivative)
3201	Communication Processor
3202	Electronic Unit
3203	Fire Control Unit
3204	Remote Fire Unit
3205	Fire Control Panel
3206	Adney Level
3207	Short-No Voltage Tester
3208	Test Set-Simulator (Organization) (Not on SPL)
3209	Test Set-Simulator (Direct Support) (Not on SPL)
3210	Organization Level Card Caddy Maint. Kit (Not on SPL)
3211	Direct Support Level Card Caddy Maint. Kit (Not on SPL)

33	Missile Round
3301	Warhead Section
3302	Missile Main Assemblage
34	Missile Cannister (Shipping & Storage)
3401	End Closures
3402	Storage Tube
3403	Shock Mitigating System
3404	Lift Mechanism

Table A2.2-6. Baseline System Self-Propelled Launcher
(Wheeled Version - LANCE II)

Functional Group Code	System/Subsystem Nomenclature
1	Engine (DDA 8V92TA)
0101	Engine Block (736 in ³)
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Clutch
0201	Clutch Assembly
03	Fuel System
0301	Fuel Tank Assembly (100 gallon)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor

04	Exhaust System
0401	Exhaust Manifold
0402	Muffler
05	Cooling System
0501	Radiator (Heavy Duty)
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Heater Assembly (Cold Weather Starting)
0505	Transmission/Convertor Oil Cooler
06	Electrical System (24V)
0601	Alternator/Generator (62 amp)
0602	Battery (4 each, 12 volt)
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Trailer Electrical Connector Assembly
0610	Diagnostic Connector Assembly (STE/ICE)

07	Transmission (Allison HT740D)
0701	Torque Converter
0702	Transmission Assembly
0703	Oil Filter and Screen
08	Transfer and Final Drive Assembly (8x8)
0801	Transfer Gearcase (Oshkosh 55000-Two Speed)
0802	Power Take-Off Assembly
09	Shafts
0901	Drive Shaft Assembly
0902	Final Drive Assembly
10	Front Axle Assembly (Oshkosh 46K)
1001	Differential (GAWR 30,000 lbs, Ratio 4.57:1)
11	Rear Axle Assembly (Eaton DS-381)
1101	Differential (GAWR 30,000 lbs, Ratio 5.43:1)
12	Brake System (Dual Air)
1201	Service Brakes
1202	Parking Brakes

1203	Brake Drums
13	Wheels
1301	Tires (16.00R20)
14	Steering System
1401	Power Steering Assembly
1402	Steering Shaft
15	Towing System
1501	Towing Pintel Assembly
16	Suspension System (Hendrickson RT 340)
1601	Spring Assembly - With Equalizing Beams
1602	Shock Absorber Assembly
17	Not Applicable
18	Body and Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Brake Peddle Assembly

1806	Doors
1807	Heater and Ducting
1808	Instrument Panel
19	Not Applicable
20	Not Applicable
21	Not Applicable
22	Body Chassis (GVWR 60,000 lbs)
2201	Fenders
2202	Bumpers
2203	Stowage Compartment
2204	Spare Tire Stowage Assembly
2205	Service and Air Brake Connectors
2206	Slave Start Connector
2207	Frame Assembly (.375 in)
23	Environmental Control System
2301	Hybrid Collective Protection Equipment (HCPE)
2302	Personnel Protective Equipment

2303	Personnel Decontamination Equipment (M11, M13, M258)
2304	Fire Suppression System (Halon 1301)
24	Communications System
2401	VHF-FM Radio Set (SINCGARS, VRC-()4)
2402	Comsec Unit (Vandal, KYV-4)
2403	Intercom Set (VIC-1)
2404	Digital Data Communications Set (PLRS, VSQ-1)
25	Navigation System
2501	Inertial Navigation Set (USQ-70)
2502	Attitude Heading Reference Set (LR-80)
2503	Not Applicable
2504	Distance Transmitter Unit
26	Not Applicable
27	Not Applicable
28	Not Applicable
29	Not Applicable

30	Launch Fixture (HARPOON Derivative)
3001	Base Frame Assembly
3002	Not Applicable
3003	Turret Assembly
3004	Canister Launch Platform
31	Launcher Drive System (MLRS Derivative)
3101	Not Applicable
3102	Not Applicable
3103	Position Monitors
3104	Hydraulic System
3105	Manual Back-Up System
3106	Power System
3107	Power Distribution Box
3108	Heat Exchanger
32	Fire Control System (MLRS Derivative)
3201	Communications Processor
3202	Electronic Unit
3203	Fire Control Unit
3204	Remote Fire Unit
3205	Fire Control Panel
3206	Abney Level
3207	Short-No Voltage Tester
3208	Test Set Simulator (Organizational)

3209	Test Set Simulator (Direct Support)
3210	Maintenance Kit (Organizational)
3211	Maintenance Kit (Direct Support)
33	Missile Round (LANCE II)
3301	Warhead Section
3302	Missile Main Assemblage
34	Missile Canister
3401	End Closures
3402	Launch Tube
3403	Shock Mitigating System
3404	Lift Mechanism

Table A2.2-7. Baseline System Resupply vehicle
(Heavy Expanded Mobility Tactical Truck (HEMTT) M985)

<u>Functional Group Code</u>	<u>System/Subsystem Nomenclature</u>
01	Engine (Detroit Diesel 8V92TA)
0101	Engine Block (736 in ³)
0102	Starter
0103	Lubricating System
0104	Air Induction System
0105	Engine Test Set (STE/ICE)
02	Clutch
0201	Clutch Assembly
03	Fuel System
0301	Fuel Tank (100 gallon)
0302	Engine Fuel Pump
0303	Fuel Heater Assembly
0304	Governor
04	Exhaust System
0401	Exhaust Manifold
0402	Muffler

05	Cooling System
0501	Radiator (HD)
0502	Coolant Pump
0503	Surge Tank
0504	Coolant Heater Assembly (Cold Weather Starting)
0505	Transmission/Convertor Oil Cooler
06	Electrical System (24 volt)
0601	Alternator/Generator (62 amp)
0602	Battery (4 each, 12 volt)
0603	Wiring Harness
0604	Lights
0605	Electrical Gauges and Indicators
0606	Electrical Switches
0607	Electrical Relays
0608	Circuit Breakers
0609	Trailer Electrical Connector Assembly
0610	Diagnostic Connector Assembly (STE/ICE)
07	Transmission (Allison HT740D)
0701	Torque Converter
0702	Transmission Assembly
0703	Oil Filter and Screen

08	Transfer and Final Drive Assembly (8x8)
0801	Transfer Gearcase (Oshkosh 55000 Two Speed)
0802	Power Take-Off Assembly
09	Shafts
0901	Drive Shaft Assembly
0902	Final Drive Assembly
10	Front Axle Assembly (Oshkosh 46K)
1001	Difrerential (GAWR 13,500 kg)
11	Rear Axle Assembly (Eaton DS-381)
1101	Differential (GAWR 13,500 kg)
12	Brake System (Dual Air)
1201	Service Brakes
1202	Parking Brakes
1203	Brake drums
13	Wheels
1301	Tires (16.00R 20x8)

14	Steering System
1401	Power Steering Assembly
1402	Steering Shaft
15	Towing System
1501	M989 Trailer Tow Assembly
16	Suspension System (Hendrickson RT 340)
1601	Spring Assembly
1602	Shock Absorber Assembly 17
	Not Applicable
18	Body and Cab
1801	Windshield
1802	Rear Window
1803	Seats and Cushions
1804	Transmission Shift Lever
1805	Brake Peddle Assembly
1806	Doors
1807	Heater and Ducting
1808	Instrument Panel
1809	Second Unit Body
19	Not Applicable

20	Winch and Crane System
2001	Material Handling Crane
2002	Hydraulic Power Package Assembly
2003	Recovery Unit
21	Not Applicable
22	Body Chassis (GVWR 60,000 lbs.)
2201	Fenders
2202	Bumper
2203	Stowage Compartment
2204	Spare Tire Stowage Assembly
2205	Service and Air Brake Connector
2206	Slave Start Connector
2207	Frame Assembly (.375 in)
23	Environmental Control System
2301	Hybrid Collective Protection Equipment (HCPE)
2302	Personnel Protective Equipment
2303	Personnel Decontamination Equipment
2304	Fire Suppression System (Halon 1301)

24	Communications System
2401	VHF-FM Radio Set (STINGARS, VRC-()4)
2402	COMSEC Unit (vandal, KY4)
2403	Intercom Set (VIC-1)
25	Not Applicable
26	Missile Support Assembly (Note 1)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support Assembly

NOTE:

1. Required only on the MEMTT and MEMAT for the single launch alternative (ILANCE) because the missiles carried on the RSV and trailer will be uncanistered, fully assembled, ready-to-fire rounds. Not required on the multiple launch alternatives.

Table A2.2-8. Auxiliary Trailer (Heavy Expanded
Mobility Ammunition Trailer (HEMAT) - M989)

Functional	
<u>Group Code</u>	<u>System/Subsystem Nomenclature</u>
01	Not Applicable
02	Not Applicable
03	Not Applicable
04	Not Applicable
05	Not Applicable
06	Electrical System
0601	Not Applicable
0602	Not Applicable
0603	Wiring System
0604	Lights
07	Not Applicable

08	Not Applicable
09	Not Applicable
10	Front Axle, Rear Axle
12	Brake System
1201	Service Brakes
1202	Parking Brakes
1203	Brake Drums
13	Wheels
1301	Tires
14	Not Applicable
15	Towing System
1501	Towing Pintel Assembly
16	Suspension System
1601	Spring Assembly
1602	Shock Absorber Assembly
17	Not Applicable

18	Not Applicable
19	Not Applicable
20	Not Applicable
21	Not Applicable
22	Chassis/Frame
2201	Not Applicable
2202	Rear Bumper
2203	Not Applicable
2204	Spare Tire Stowage Assembly
2205	Service and Air Brake Connector
23	Not Applicable
24	Not Applicable
25	Not Applicable
26	Missile Support Assembly (Note 1)
2601	Rear Support Assembly
2602	Forward Support Assembly
2603	WHS Cradle Support Assembly

NOTES:

1. Required on the HEMAT for the single launch alternative because the missiles carried on this trailer will be uncanistered, fully assembled, ready-to-fire rounds. Not required on the multiple launch alternatives.

APPENDIX A2.3

SAMPLE EQUIPMENT ANALYSIS WORKSHEETS

The Equipment Analysis worksheets contained in this Appendix are samples from actual working documents derived by this study's engineering analyses and used to support the manpower analysis. Equipment lists were created from source documentation for the reference and baseline systems. The "Engineering Design Comparability Analysis" worksheets, (Table A2.3-1) are generated to assist in the analytic evaluation of the reference and the baseline systems (fielded vs conceptual). These worksheets are organized to facilitate their use in explaining RAM-D differences and are used in the training discipline to identify those areas where required skills vary from reference to baseline systems. The "RAM Data" worksheets (Table A2.3-2) contain summary calculations and source data figures utilized in computing manpower demands for both scheduled (PM) and unscheduled (CM) maintenance. RAM Data worksheets are generated for each reference and baseline system. RAM data is broken down to at least a subsystem level to facilitate identifying high drivers among the engineering parameters for tradeoff analysis. The Equipment Analysis worksheets also serve as a basis for making engineering judgements.

Table A2.3-1. Sample Design Differences Worksheet.
ENGINEERING DESIGN COMPARABILITY ANALYSIS

WHEELED CARRIER

2.1 of 3

FGC	NOMENCLATURE	REFERENCE DESIGN	BASELINE DESIGN	DIFFERENCES	IMPACT	SOURCE	REMARKS
01	Engine	10 Ton M.A.N. Model 02840 10 Cylinder 401 BHP (@ 2300 RPM)	HEMTT 10-Ton (XM 977) DDA 8V92TA 8 Cylinder 445 BHP 736 in ³ displacement	Ref. engine under powered for required loading	Oil seals failed. Ref. engine was modified with a larger oil holding tank to complete the test.	1/ 2/ 3/	Note 1 - Modifications to the ref vehicle were made in the interest of testing a more representative vehicle for the HEMTT concept.
05	Cooling System	Liquid Cooled	Radiator Core-Fin + Tube type 1710 in ² , air surface, gear driven centrifugal water pump, built-in deceleration system. 32" Fan - 8 blade, dual belt driven.	Cannot be determined. See Note 2		2/ 3/	Note 2 - Detailed design specs were unavailable, however, a HEMTT feasibility test study was accomplished at APG on the 10 ton M.A.N. model. The tested design was defined to represent the operating characteristics to be used on HEMTT. All components used on HEMTT are current production parts and do not represent any high reliability risks.
					1/ ANSAA M.A.N. RAM 2/ OSHKOSH Truck Corporation Spec. Chart. 3/ TM9-2320-222-30	ANALYSIS TO TECOM	dated. 12/79.

Table A2.3-1. (Continued).
ENGINEERING DESIGN COMPARABILITY ANALYSIS

FGC	NOMENCLATURE	REFERENCE DESIGN	BASELINE DESIGN	DIFFERENCES	IMPACT	SOURCE	REMARKS
06	Electrical System	24 Volt System	62 Amp Alt. 24 Volt System (4) - 12 Volt Batteries.	See Note 2.		2/ 3/	See Note 2.
07	Transmission	Modified with heavy duty, 4-speed 2 range transfer (8 Speed) 2F 48-150 GP	Allison MT7400 4-speed automatic with torque converter	Transmission shifting characteristics	Not known, but baseline would historically have more convenient handling characteristics, however the reference system would require less total maintenance.	1/ 2/ 3/	See Note 1
08	Transfer Case	Two-speed 2F 150 GPA	Oshkosh 55000 two-speed air operated, w/front tandem disconnect.	See Note 2.		2/ 3/	See Note 2
09	Shafts	Drive Shafts Coupling Shafts	Propeller Shaft Coupling Shaft	Baseline has a larger diameter driveline (propeller shaft). The ref. system u-joint couplings were designed for lower GVMR and fractured under the additional stress.	Ref. design experienced a high failure rate during reliability testing.	1/	See Notes 1 + 2
10	Front and rear axles	All axles are drive axles	Oshkosh 46K 5.57: 1 ratio GVMR: 30,000 lbs. 30° front turning angle. Single reduction, single cardan joint, closed type steering ends.			2/ 3/	

Table A2.3-1. (Continued).
ENGINEERING DESIGN COMPARABILITY ANALYSIS

WHEELED CARRIER

P. 3 of 3

FGC	NOMENCLATURE	REFERENCE DESIGN	BASELINE DESIGN	DIFFERENCES	IMPACT	SOURCE	REMARKS
12	Brake System	Front - Air Over hydraulic Rear - Air operated	Internal Shoe Dual System Air Operated			2/ 3/	See Note 2.
13	Wheels		20.00 x 10.00 Steel disk			2/	See Note 2.
1301	Tires	Tube type	Tube type Radial traction 16.00 R 20	None	None	1/ 2/	
14	Steering System	Recirculatory ball power assist	Integral hydraulic gears (main and booster)			2/ 3/	
16	Suspension System	Coil Spring at each wheel. Telescopic adjustable shocks each wheel.	Hendrikson RT 340 Leaf springs, steel saddle equalizing beam	Leaf springs maintain their operating characteristics longer under heavy loading and rough terrain	Higher failure rate for the ref. system shocks and springs	1/ 2/ 3/	If the ref. system could be brought up to spec. GVMR with coil springs, it would be a favorable maneuverability tradeoff in design.
1609	Second Unit Body		216" cargo body	Cannot be de crained		2/ 3/	See Note 2.
2207	Frametrail assembly	Welded box frame	375 in. rails, formed channel bolted construction w/grade 8 bolts				See Note 2. The HEMTT frame, spec. would suggest the minimal strength for its proposed user. Under no conditions would less than grade-8 bolts be acceptable for gusset/cross member support. They would shear under the stress of proposed terrain and a definite degraded mission availability.

Table A2.3-2. RAM Analysis Worksheet.

System: Reference - Wheeled Carrier (M.A.N. 10-Ton).

FGC	SUBSYSTEM	USE/ PERIOD	CORRECTIVE MAINTENANCE				PREVENTIVE MAINTENANCE ¹			
			MA/ USE	MMH/ MA	MTTR	MR	CREW	ORG	DS	
01	Engine	1000 Operating Hours	74	0.558	0.361	0.041	0.0	3.0	5.8	
03	Fuel System	"	9	0.519	0.486	0.004	0.3	1.9	1.5	
04	Exhaust System	"	--	--	--	--	0.0	0.2	0.0	
05	Cooling System	"	--	--	--	--	0.3	1.0	0.0	
06	Electrical System	"	23	0.445	0.445	0.010	1.3	5.0	2.0	
07	Transmission	"	8	10.133	5.144	0.037	0.0	4.5	1.1	
08	Transfer and Final Drive Assembly	"	1	1.000	1.000	0.000	--	--	--	
09	Shafts	"	1	2.000	1.000	0.001	0.0	0.4	0.0	
10	Front Axle	"	6	5.293	2.936	0.030	0.3	1.3	0.0	
11	Rear Axle	"	1	5.100	3.300	0.006	0.3	0.9	0.0	
12	Brake System	"	10	1.924	1.056	0.019	0.1	1.5	0.0	

Table A2.3-2. (Continued).

FGC	SUBSYSTEM	USE/ PERIOD	CORRECTIVE MAINTENANCE			PREVENTIVE MAINTENANCE ¹			
			MA/ USE	MMH/ MA	MTTR	MR	CREW	ORG	DS
13	Wheels	1000 Operating Hours	19	2.862	1.791	0.052	0.1	0.2	2.5
14	Steering System	"	5	1.585	0.946	0.008	0.0	1.1	0.0
15	Towing System	"	4	3.342	2.250	0.002	--	--	--
16	Suspension System	"	13	0.845	0.533	0.011	0.0	0.3	0.0
18	Body & Cab	"	6	1.887	1.100	0.011	0.5	0.1	0.0
22	Body Chassis	"	4	0.600	0.600	0.002	0.1	1.0	0.0
--	Other	"	1	0.467	0.467	0.001	--	--	--
--	TOTAL	"	177	1.3	0.9	0.235	3.3	22.4	12.9

¹PM extracted from M.A.N. MAC chart in TM 9-2320-20 with TM 9-2320-282-10 no available, therefore no further breakdown of PM numbers other than these totals as periodic requirements.

APPENDIX A3
DATA SOURCES INDEX

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APPENDIX A3
DATA SOURCES INDEX

FUNCTIONAL AREA: MISSION

CATEGORY	DATA	SOURCE	COMMENTS
1. Need	Threat Description	DARCOM: Threat Organization Tactics, and Equipment	
		TRADOC: Battlefield Development Plan	
2. Capabilities	Functional Requirements	TRADOC: Fire Support Mission Area Analysis (MAA) Phases 1 and 2	
		TRADOC: CSWS Special Task Force Briefing	
		TRADOC: FM 6-40-4, Field Artillery Lance Missile Gunnery	

CATEGORY

DATA

SOURCE

COMMENTS

TRADOC: ARTEP 6-595 The
Field Artillery Battalion
Lance

Operational
Concepts

TRADOC: CSWS
Special Task Force; Initial
Corps Support Weapon System
Operational and
Organizational Plan (O&O
Plan)

TRADOC: FM 525-5, Military
Operations, Operational
Concepts for the Airland
Battle and Corps Operations
1986

TRADOC: Field Artillery
School; Organizational and
Operational Concepts for an
Improved Fire Support C3
System

FUNCTIONAL AREA: DESIGN

CATEGORY	DATA	SOURCE	COMMENTS
1. Missiles	Design/RAM	U.S. Army Material Readiness Support Activity, Lexington, Kentucky	
		U.S. Army Test & Evaluation Command, Aberdeen Proving Grounds, Maryland	
		U.S. Army Armament Material Readiness Command, Rock Island, Illinois	
		U.S. Army Material Systems Analysis Activity, Aberdeen Proving Grounds, Maryland	
		U.S. Army Missile Command, Redstone Arsenal, Huntsville, Ala.	

CATEGORY

DATA

SOURCE

COMMENTS

Vought Corporation, Grand
Prairie, Texas

AR 220-1 Unit Status
Reporting (Missile Readiness)

2. Vehicle

Design/RAM

U.S. Army Tank-Automotive
Command Warren, Michigan 10
Ton M.A.W.

FMC Corporation San Jose,
California

Army Material Systems
Analysis Activity A.P.G.
Aberdeen Proving Grounds,
Maryland

Vought Corporation Grand
Prairie, Texas M2

CATEGORY	DATA	SOURCE	COMMENTS
3. Protective Systems	Design/RAM	U.S. Army Chemical Systems Laboratory Aberdeen Proving Grounds, Maryland	
4. Navigation Systems	Design/RAM	RAM Summary NAMSU Report #4790A7142-01 Navy Maintenance Support Office Mechanicsburg, PA	
5. Communication	Design/RAM	TRADOC: Systems Managers Offices Ft Gordon, GA	
		TRADOC: Systems Managers Office/PLRS Ft. Gordon, GA	
		TRADOC: FM 24-24 Radio and Radar Reference Data	
		R&M Summary NAMSU Report #4790A7142-01 Navy Maintenance Support Office Mechanicsburgh, VA	

CATEGORY	DATA	SOURCE	COMMENTS
6. Fire Control	Design/RAM	NAVY: DD-963 class HARPOON Weapon System Naval Sea Systems Command, Washington, DC	
7. Baseline Concepts	Improved LANCE		
	Multiple Launch Interdiction System (MLIS)	Vought Corporation Grand Prarie, Texas Corps Support Weapon System Concept Definition: Multiple Launch Interdiction System (MLIS): Volume II Technical (Secret)	
	LANCE II	Vought Corporation: Grand Prarie, Texas Corps Support Weapon System Concept Definition; LANCE II; Volume II Technical (Secret)	

FUNCTIONAL AREA: MANPOWER

CATEGORY	DATA	SOURCE	CATEGORY
1. Workload	Maintenance	NAVY: Navy Maintenance Data Collection System	
	NAVY:	Weapons Quality Engineering Center, Concord, CA (WQEC) Maintenance Data System	
		TRADOC: Ft. Lee, VA Updated Log Center MACRIT File	
		U.S. Army Material Readiness Support Activity; MACRIT Master Data File	
	SB 700-20	Used to obtain line item number for extracting MACRIT data.	
2. Methodology	Constraints	AR 570-2 Manpower Authorization Criteria (MACRIT)	
	Allowances	AR 570-2 Manpower Authorization Criteria (MACRIT)	
	Capabilities	CDB/DRC Mission Profile for CSWS	

FUNCTIONAL AREA: TRAINING

CATEGORY	DATA	SOURCE	COMMENTS
1. Task Requirements	Individual Tasks Accomplished by MOS/Skill Level Trainer's Guides Soldiers Manuals		
	Collective Tasks	ARTEP (Army Training and Evaluation Program)	
2. MOS/Skill Levels	MOS/Skill Level Descriptions and Career Management Fields	AR 611-201 (Enlisted Career Management Fields and Military Occupational Specialties)	
3. Course Outlines	Synopsis of Formal School Courses	U.S. Army Formal Schools Catalog, DA PAM 351-4	
	Course Outlines	Individual Service Schools, Programs of Instruction	

CATEGORY	DATA	SOURCE	COMMENTS
	Training Paths	Military Occupational Specialty Training Cost handbook (MOSB)	
4. Course Information	Instructor	Individual Service Schools	
	Contact Hours	TRADOC Form 377-1-R	
	Student	TRADOC Form 377-1-R or TRADOC	
	Instructor Ratio	CIR 351-12 DA PAM 370-538	
	Course:	TRADOC: ATRM-159 Cost	
	Statistical Information	Analysis Program (MOS Training Costs)	
	INCOES	1POI and AR 611-201	
	Courses and Course Pre-requisites		

CATEGORY	DATA	SOURCE	COMMENTS
5 Training Devices	List and Description current Items in inventory	Individual Service School and DA PAM 310-12 (Index and Description of Army Training Devices)	
6. Extension Training Materials	Synopsis of Extension Training Materials	Training Material DA PAM 350- 106-3 ETM Extension Training Materials Catalog: Field Artillery Battalion LANCE (ARTEP 6-595)	
		Synopsis of Correspondence Courses Army Correspondence Course Program	
	Promotion & Attrition	Original Source Enlisted Master File (EMF)	
	TTHS Rates	Chief or Personnel Operations 45 Original Source EMF	

CATEGORY	DATA	SOURCE	COMMENTS
	Avail- ability for 1983-1948 by MOS/Paygrade	Personnel Policy Project Model (P3M)	
1. Hardware			
2. Personnel	Salaries	Comptroller of the Army (COA): Force Cost Information System: Army Force Planning Cost Handbook	
	Other Per Cost	Comptroller of the Army (COA): Army Force Planning Cost Handbook (AFPCH) per Capita Factory	
3. Training	Course Cost Elements:	Aggregate COA: Soldier Cost Information System: MOS Training Cost Handbook (MOSB) and ATRM-159	
	Other Course Costs	Training Center/School Associated with Course	

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APPENDIX B

MANPOWER REQUIREMENTS ANALYSIS

Appendix B1 contains the Mission Event diagrams, Figures B1-1 to B1-10, that were used to record the minimum, maximum and average task group times to accomplish the mission cycle for each vehicle in the Corps Support Weapon System. The outputs of these diagrams were used in the construction of the matrix based scenario model and formulation of the operator task/event networks.

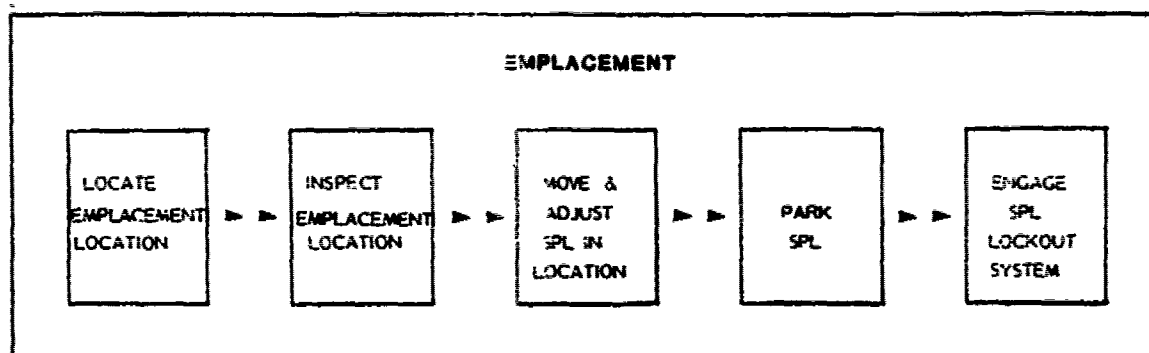
Appendix B2 contains the diagrams and tables used as inputs in the construction of the matrix based scenario model. Figures B2-1 to B2-3 display the "probability tree" diagrams used to provide inputs for matrix construction within the model. Tables B2-1 and B2-2 provided the model with the pertinent travel information required to form the basis for travel workload calculation for each system configuration. The remaining inputs for model construction were the task data outputs from the mission event diagrams.

Appendix B3 contains the diagrams used to record workload information. Figures B3-1 to B3-10 display the task/event diagrams used as a "book keeping" device in the calculation of operator workload. The workload from these diagrams was aggregated by crew positions in order to calculate CSWS crew manpower requirements.

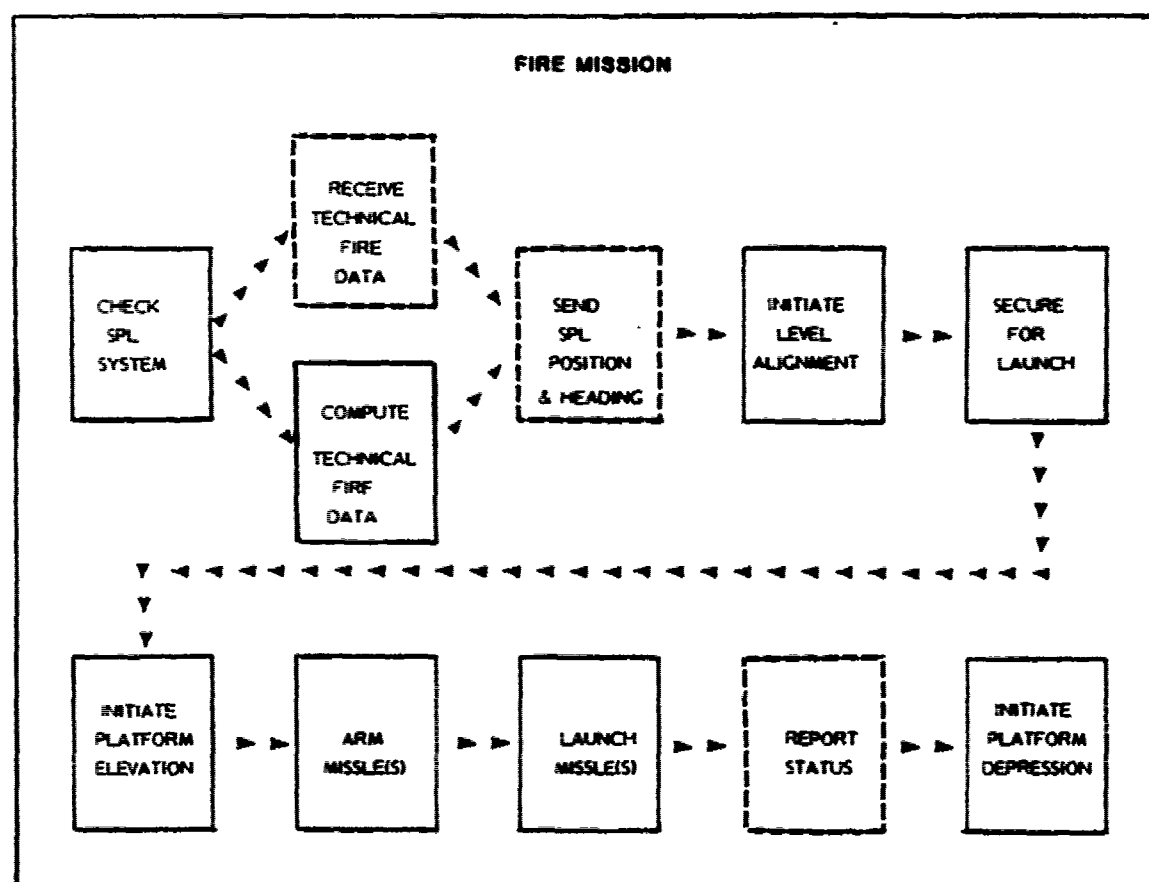
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APPENDIX B1
MISSION EVENT DIAGRAMS

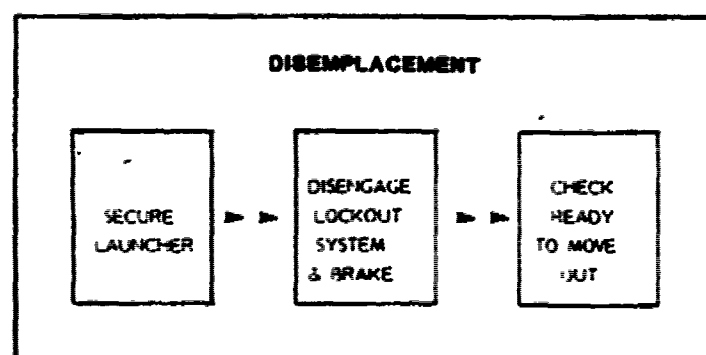
Figure BI-1. SPL Mission Event Diagram (Tracked Reference).



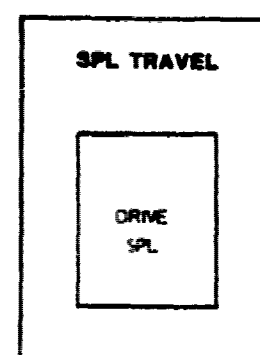
MIN 3.00 MAX 5.00 AVG 4.00



MIN 2.00 MAX 3.33 AVG 2.67



MIN 3.50 MAX 6.00 AVG 4.75



MIN .004 MAX .070 AVG .037

Figure B1-4. RSV Mission Event Diagram (Tracked Reference).

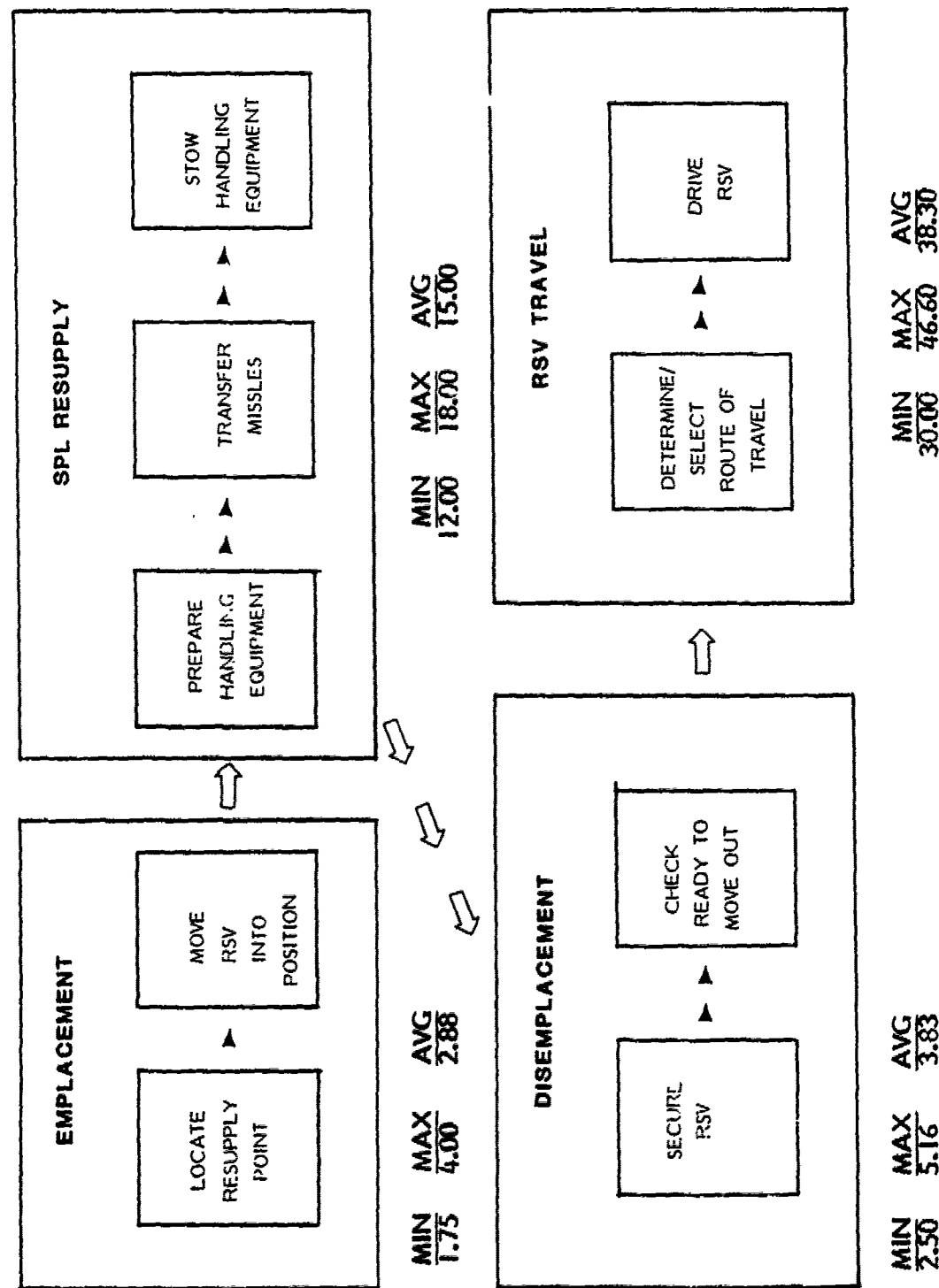
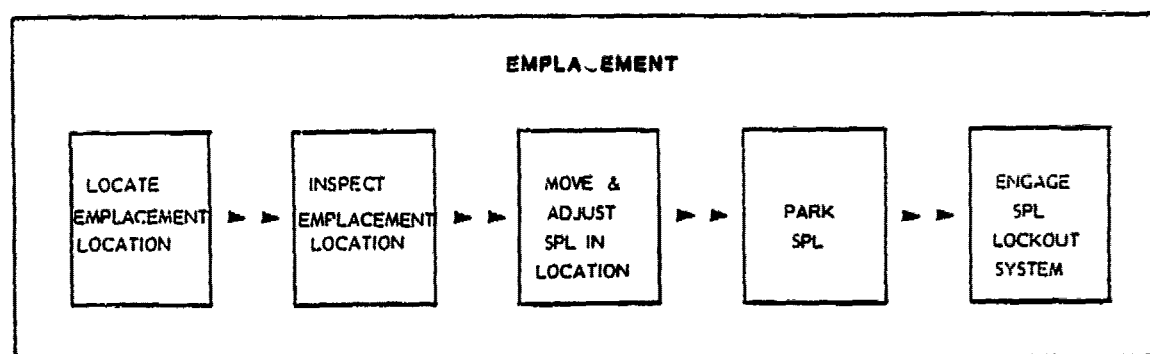
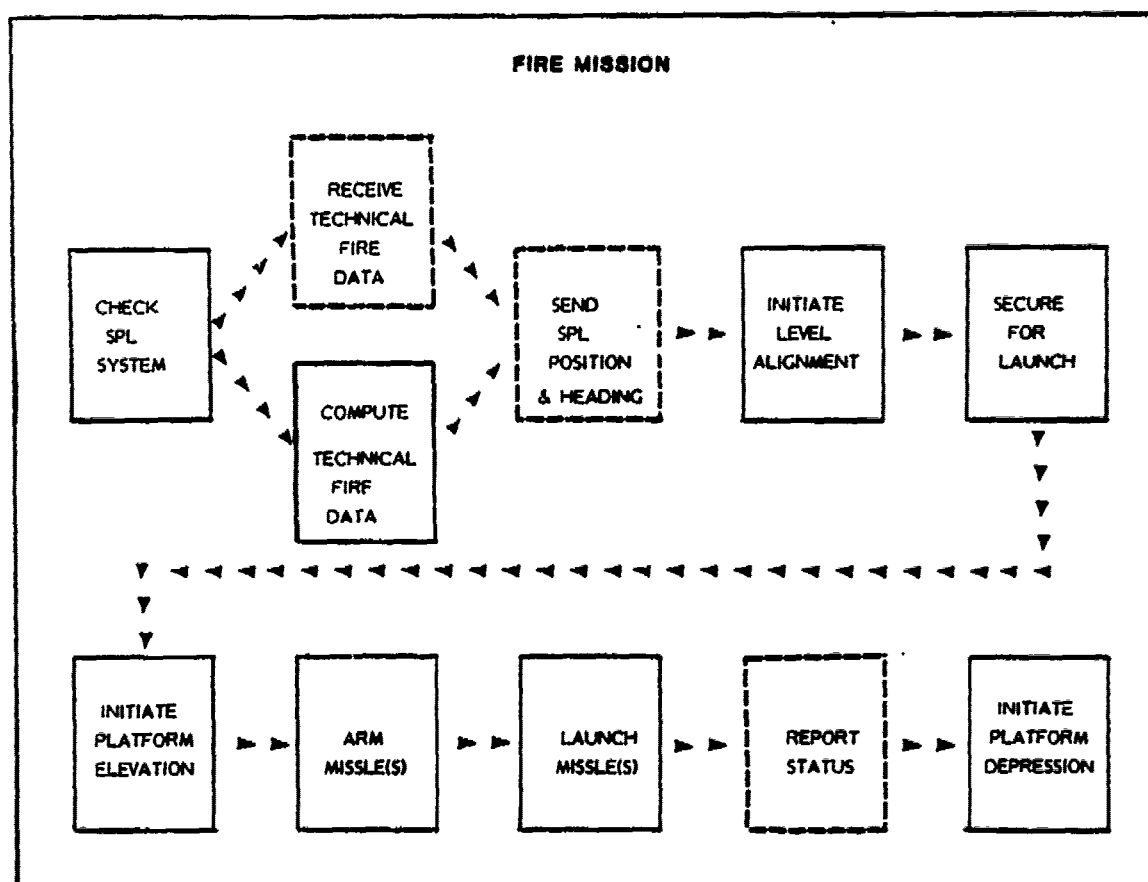


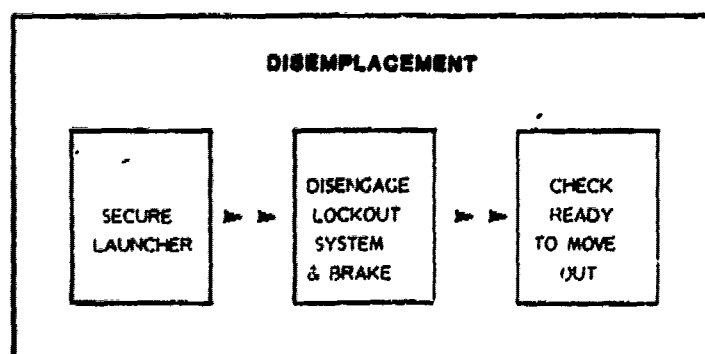
Figure BI-3. SPL Mission Event Diagram (Wheeled Reference).



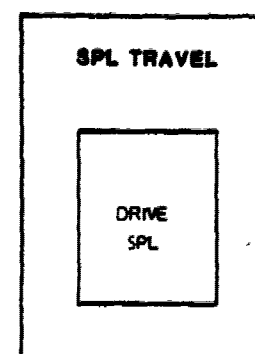
MIN 1.00 MAX 2.67 AVG 1.83



MIN 2.00 MAX 3.33 AVG 2.67 ↓



MIN 1.00 MAX 3.00 AVG 2.00



MIN .002 MAX .053 AVG .028

Figure B'-4. RSV Mission Event Diagram (Wheeled Reference).

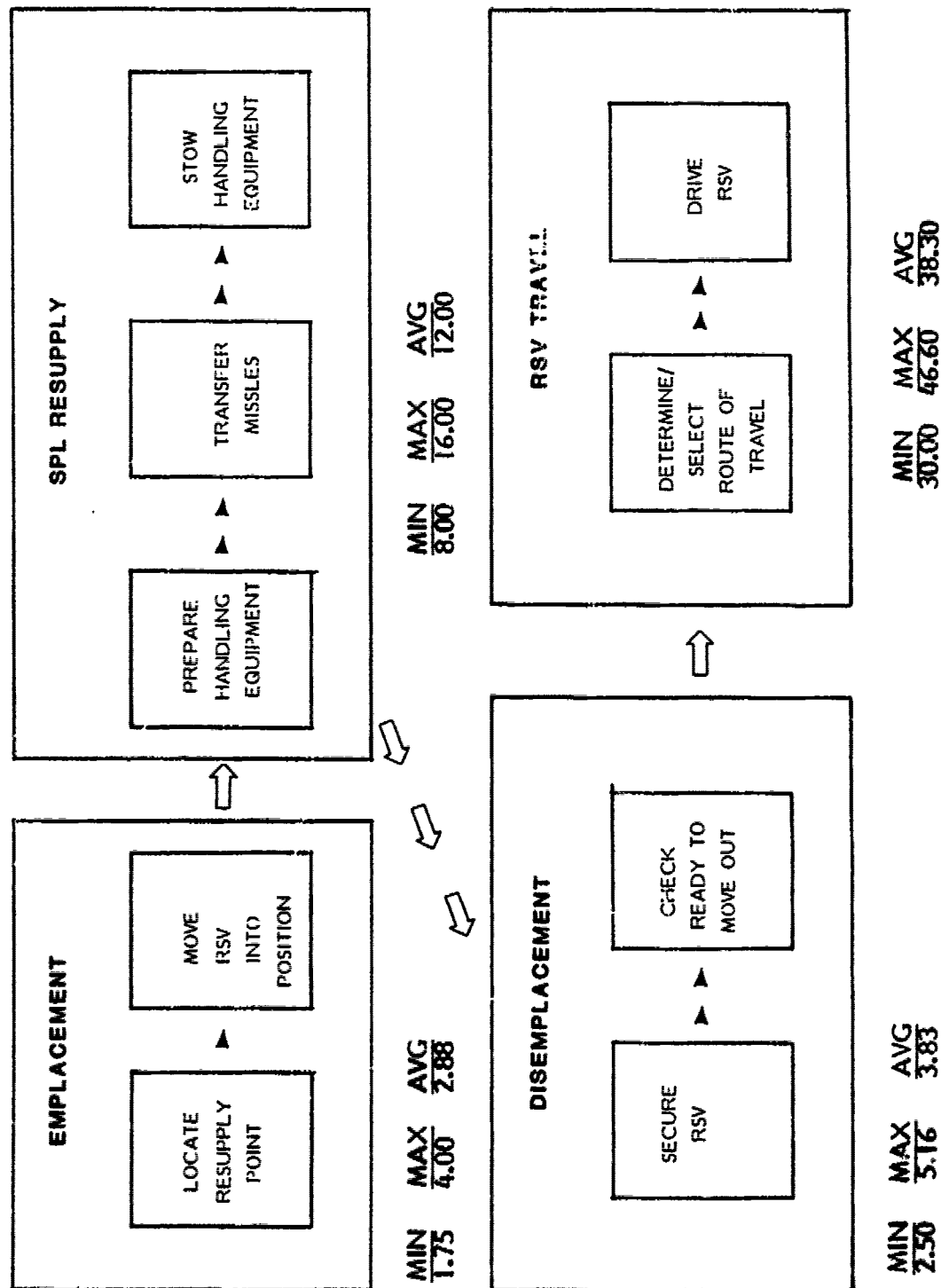


Figure B-5. SPL Mission Event Diagram (I LANCE).

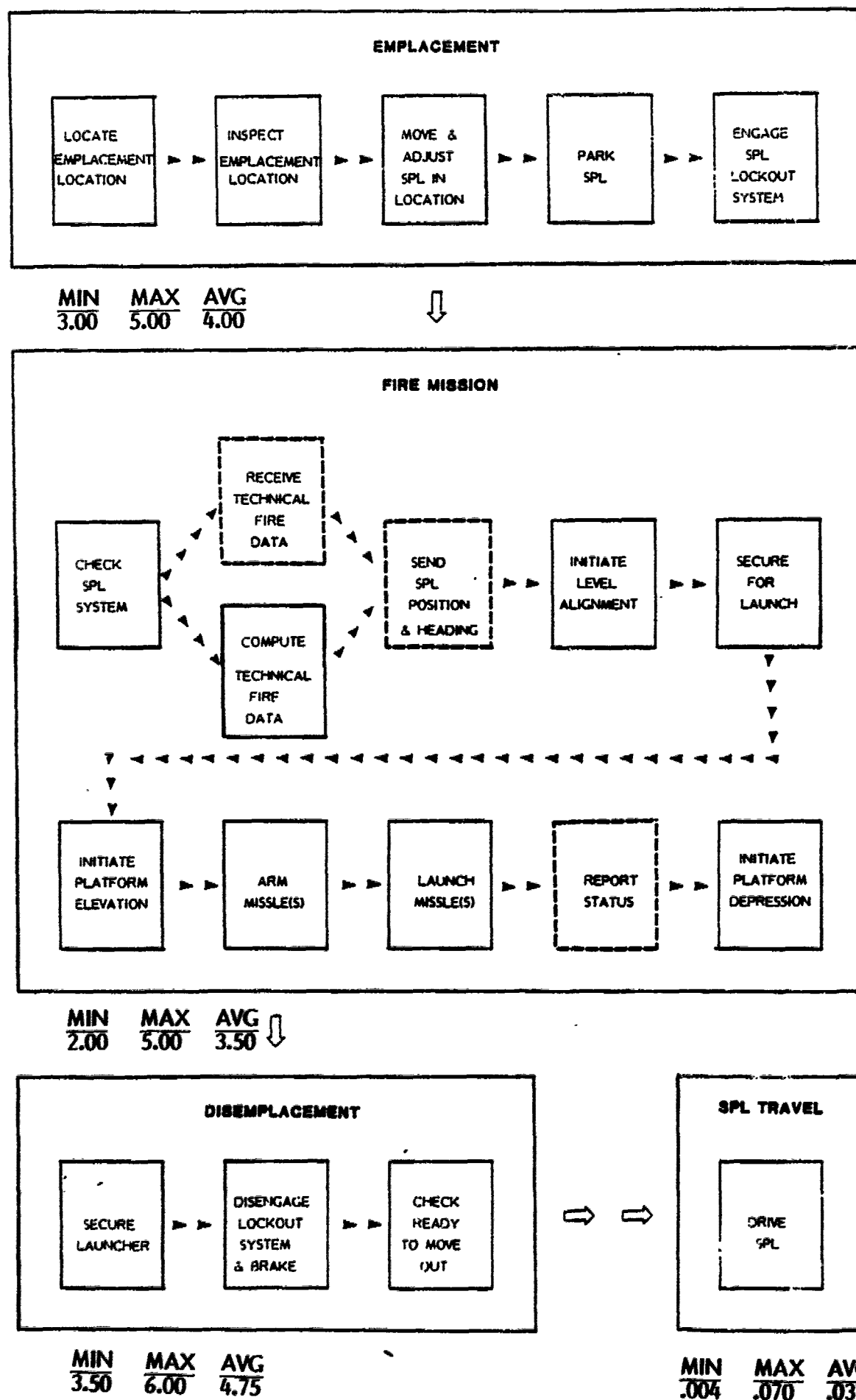


Figure B1-6. RSV Mission Event Diagram (I LANCE).

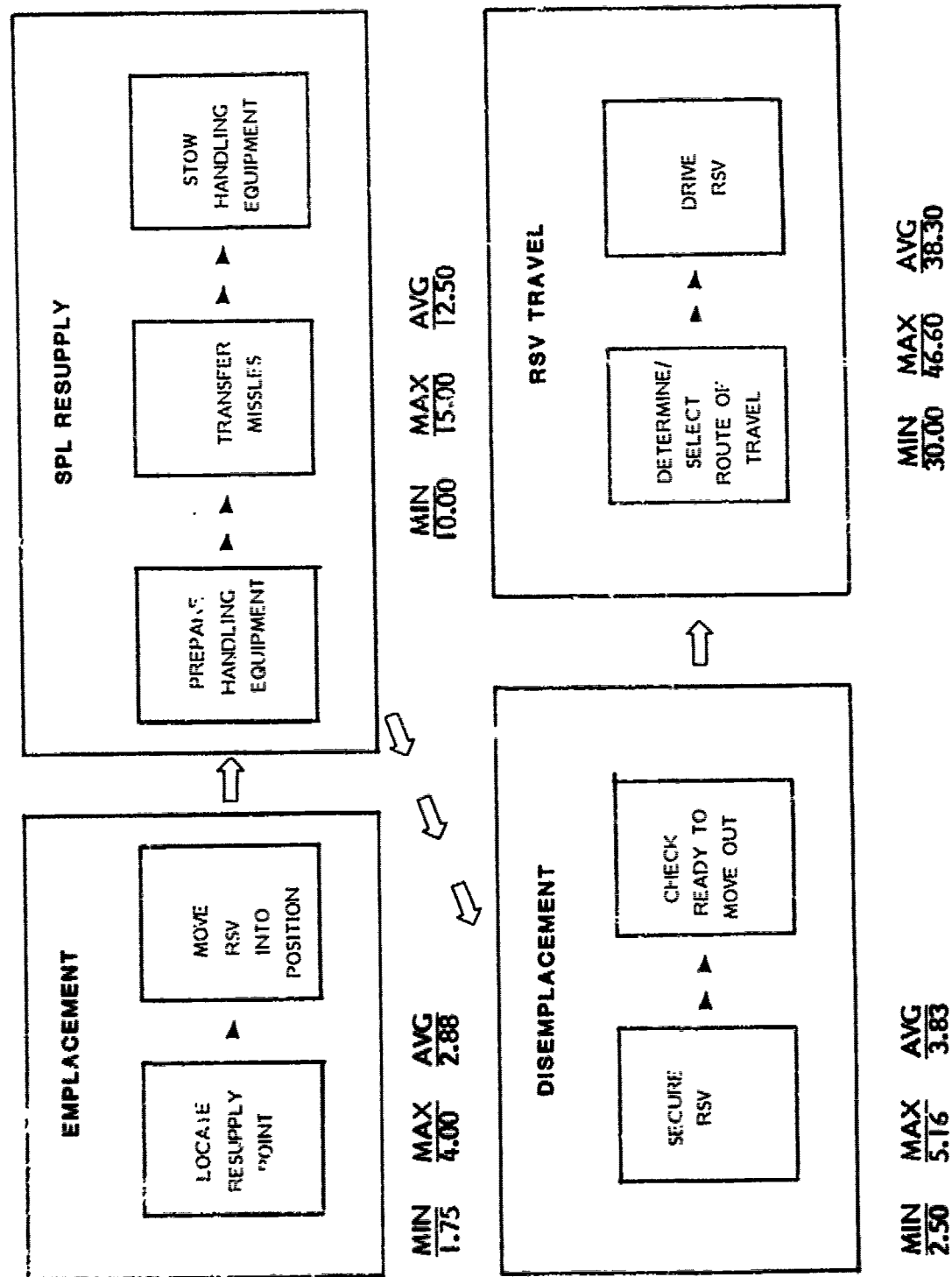
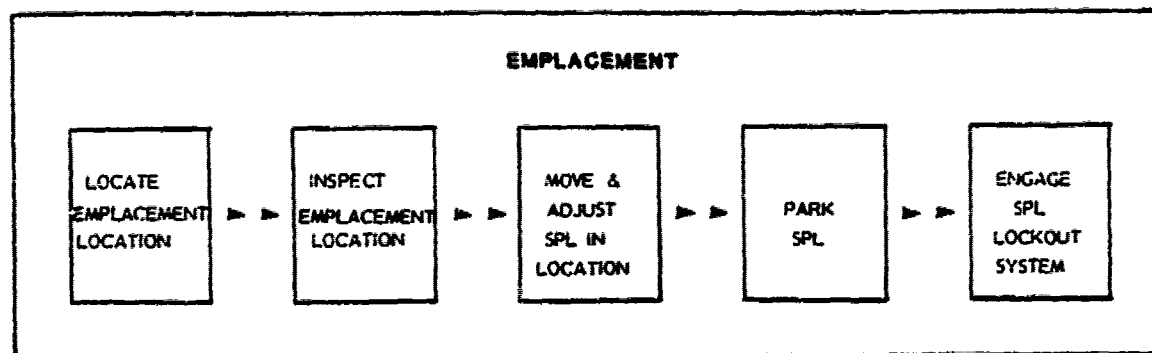
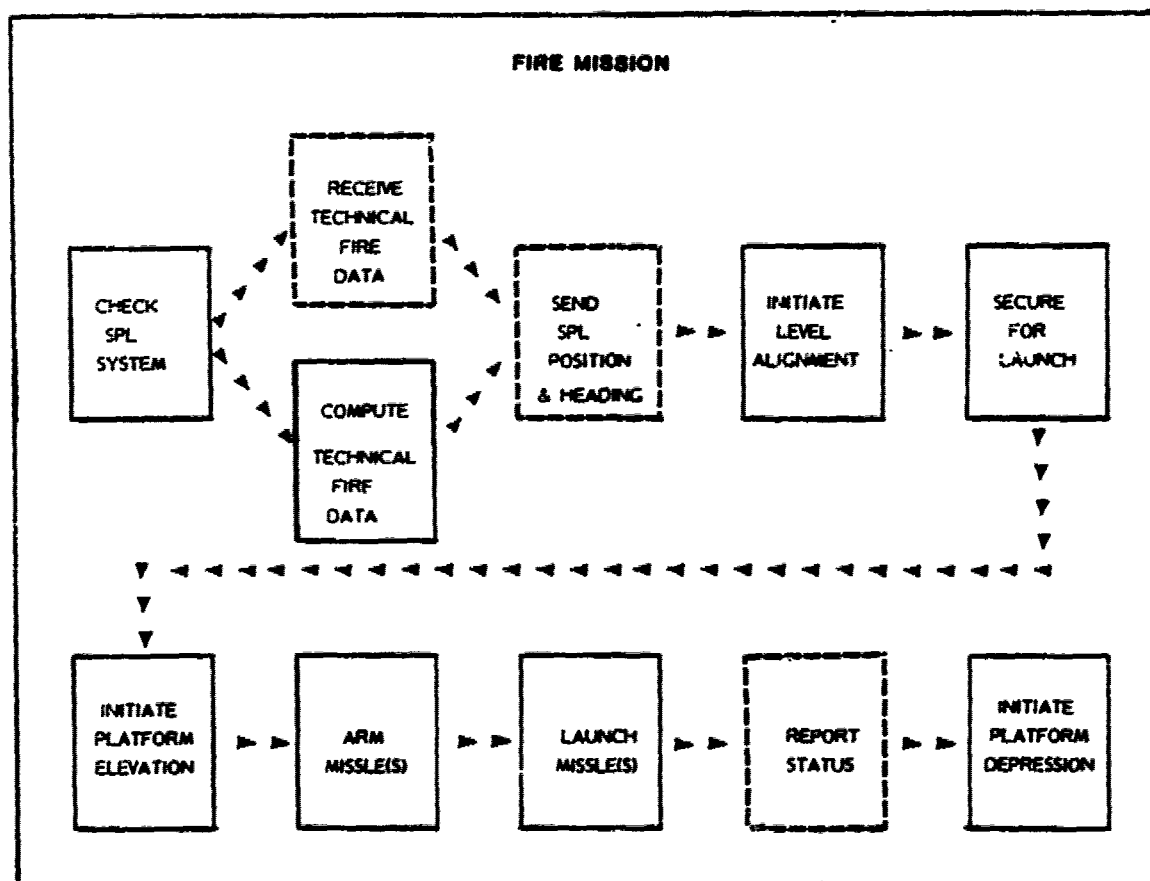


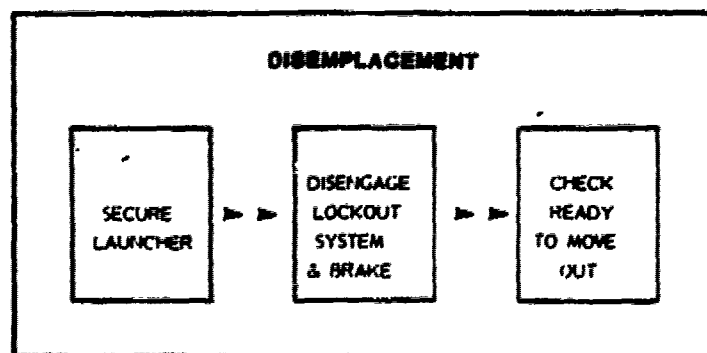
Figure B1-7. SPL Mission Event Diagram (MLIS).



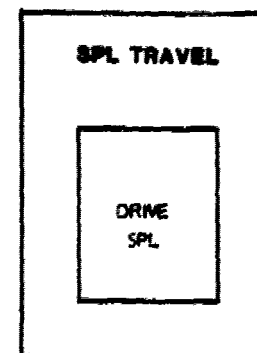
MIN .67 MAX 1.50 AVG 1.09



MIN 1.00 MAX 4.00 AVG 2.50 ↓



MIN .50 MAX 1.50 AVG 1.00



MIN .001 MAX .044 AVG .023

Figure B1-8. RSV Mission Event Diagram (MLIS).

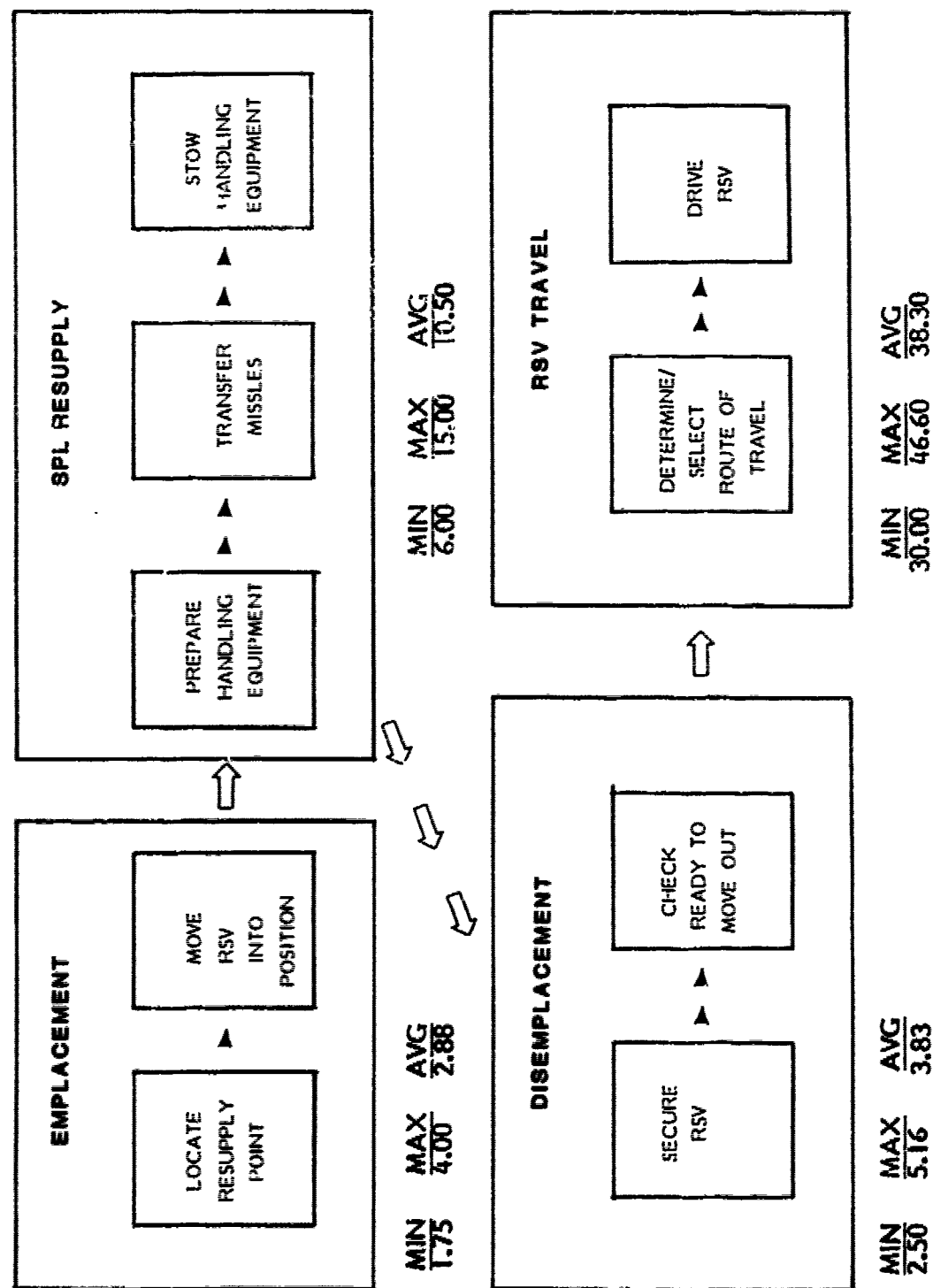
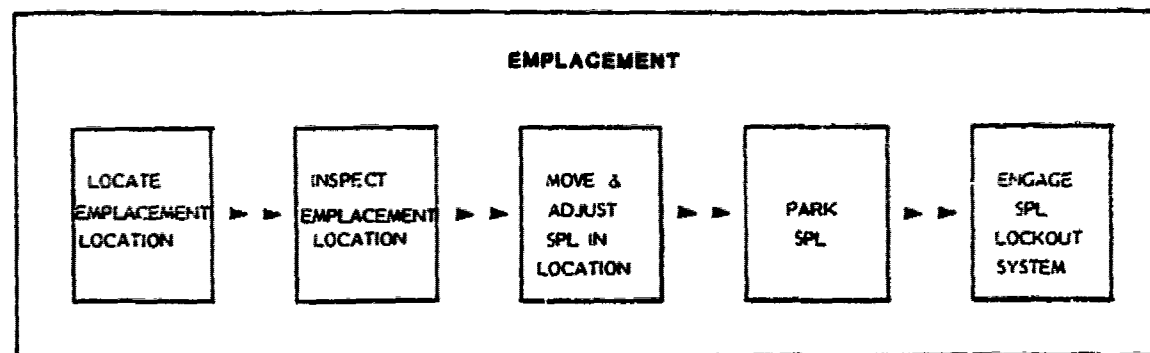
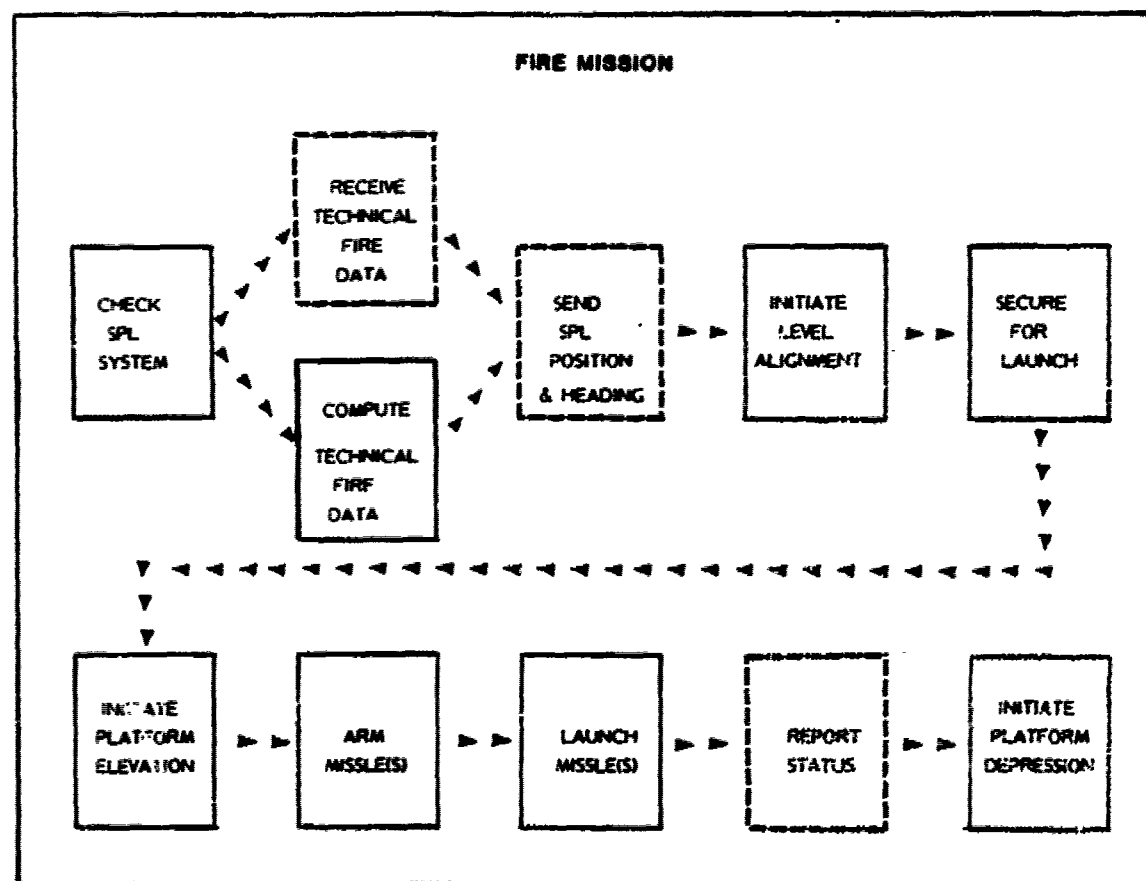


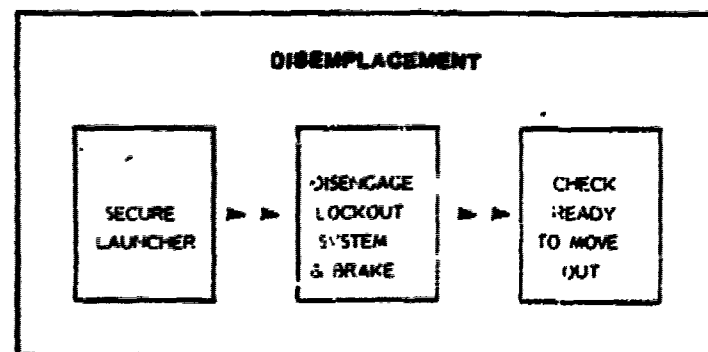
Figure BI-9. SPL Mission Event Diagram (LANCE II).



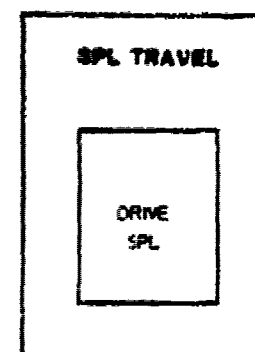
MIN 2.00 MAX 2.50 AVG 2.25



MIN 1.00 MAX 3.00 AVG 2.00

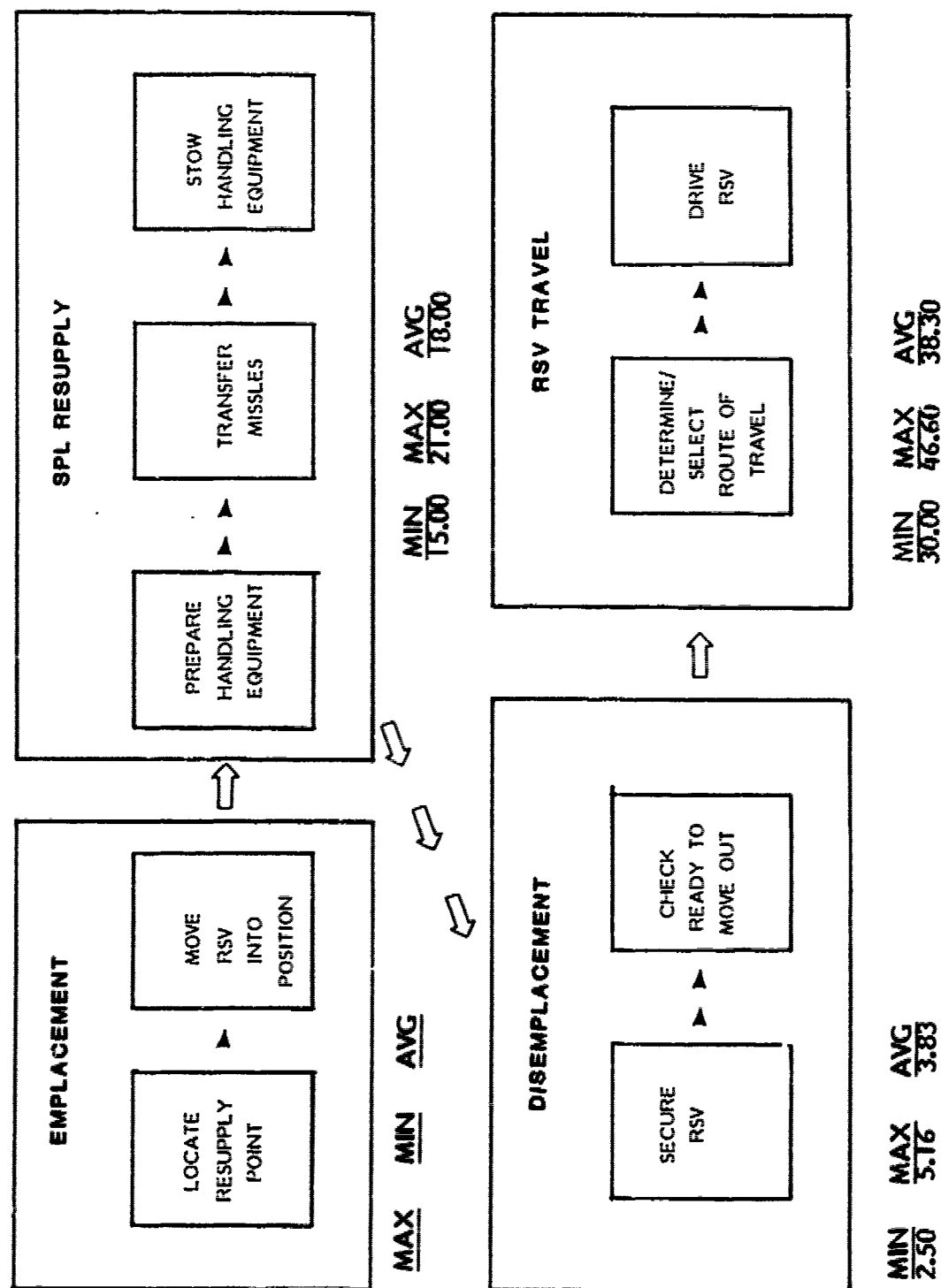


MIN 1.50 MAX 3.00 AVG 2.25



MIN .002 MAX .061 AVG .032

Figure BI-10. RSV Mission Event Diagram (LANCE II).



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APPENDIX B2
SCENARIO MODEL INPUTS

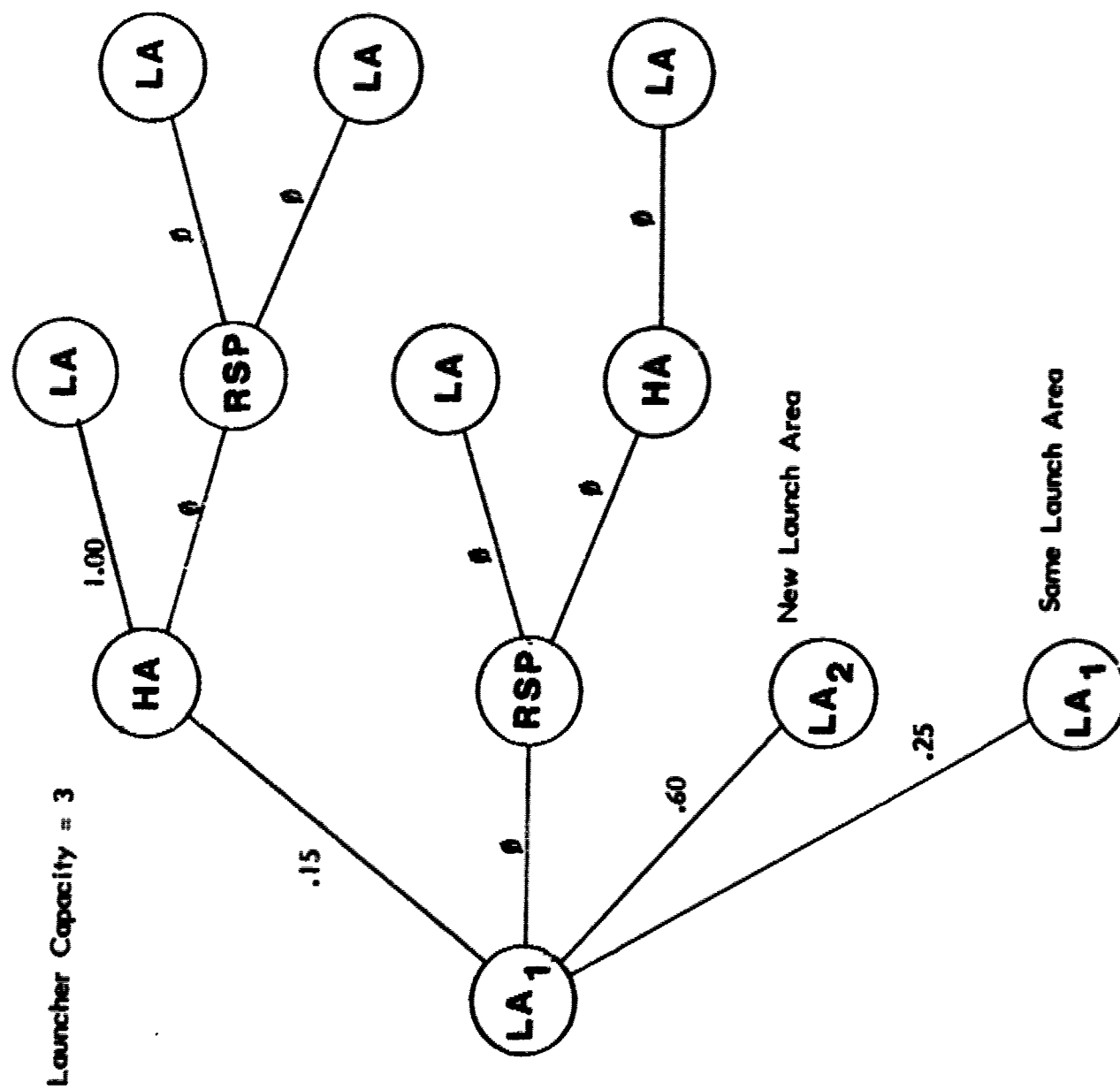
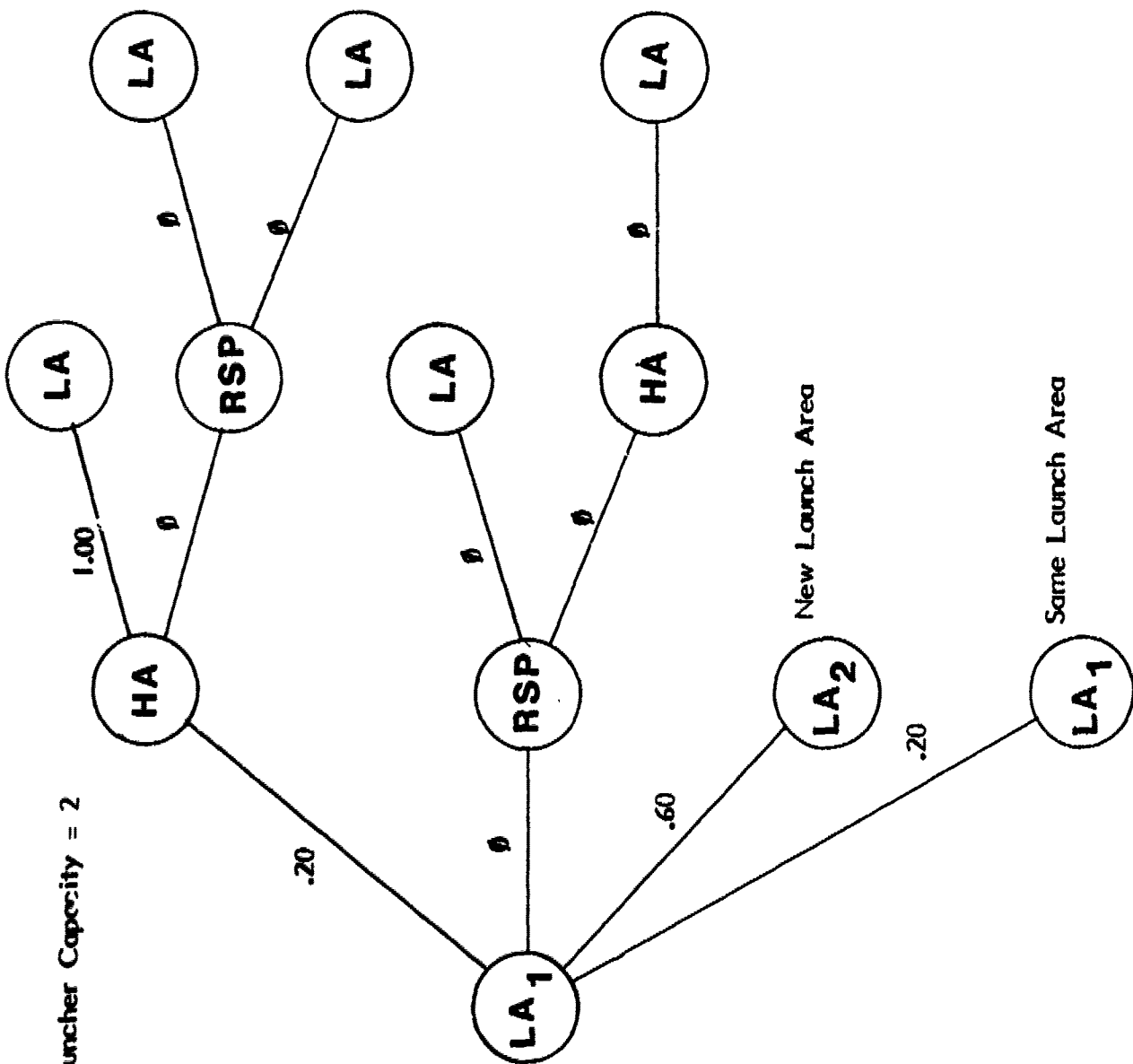


Figure B2-1. CSWS Mission Probability Tree.



KEY

LA	Launch Area
HA	Hide Area
RSP	Resupply Point

Figure B2-2. CSWS Mission Probability Tree.

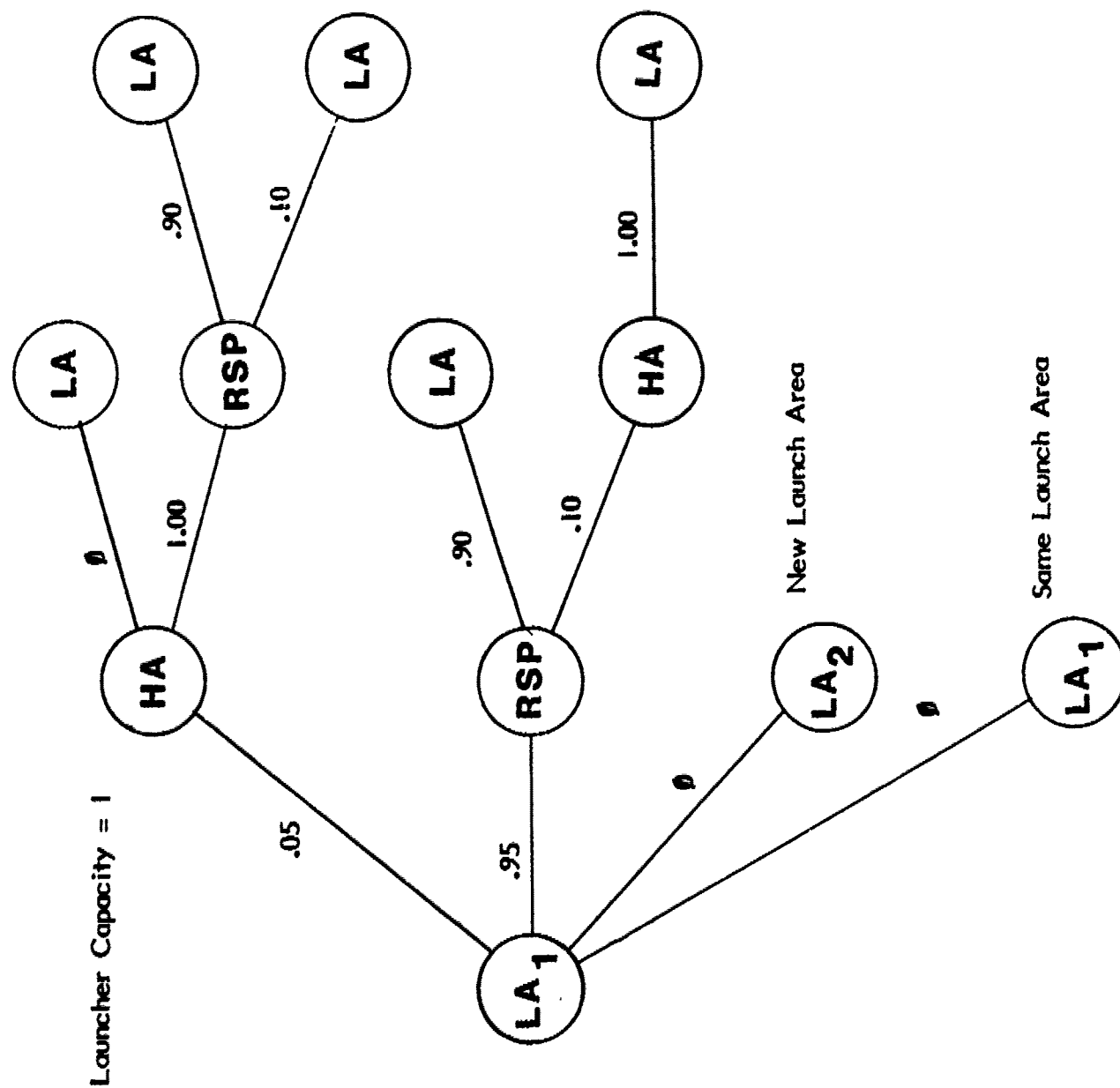


Figure B2-3. CSWS Mission Probability Tree.

Table B2-1. Scenario Travel Information.

TRAVEL DISTANCES

TRAVEL		DISTANCE (In Meters)		
<u>FROM</u>	<u>TO</u>	<u>MIN</u>	<u>MAX</u>	<u>AVG</u>
Launch Area	Launch Area	50	3600	1825
Launch Area	Hide Area	50	1000	525
Launch Area	Resupply Point	50	1000	525
Hide Area	Resupply Point	50	1000	525
Resupply Point	Ammunition Transfer Point	500	3600	2050

Table B2-2. Scenario Travel Information.

TRAVEL SPEEDS (Miles Per Hour)

	<u>MIN</u>	<u>% OCCURANCE</u>	<u>MAX</u>	<u>% OCCURANCE</u>	<u>AVG</u>
SPL					
Tracked Reference	15	80	35	20	19.0
Wheeled Reference	21	80	55	20	27.8
I LANCE	15	80	35	20	19.0
MLIS	15	80	40	20	20.0
LANCE II	21	80	55	20	27.8
RSV					
HEMTT	20	100*	--	--	20.0

*Speed restricted because of load weight.

APPENDIX B3
TASK/EVENT NETWORK DIAGRAMS

Figure B3-1. SPL Task/Event Network (Tracked Reference).

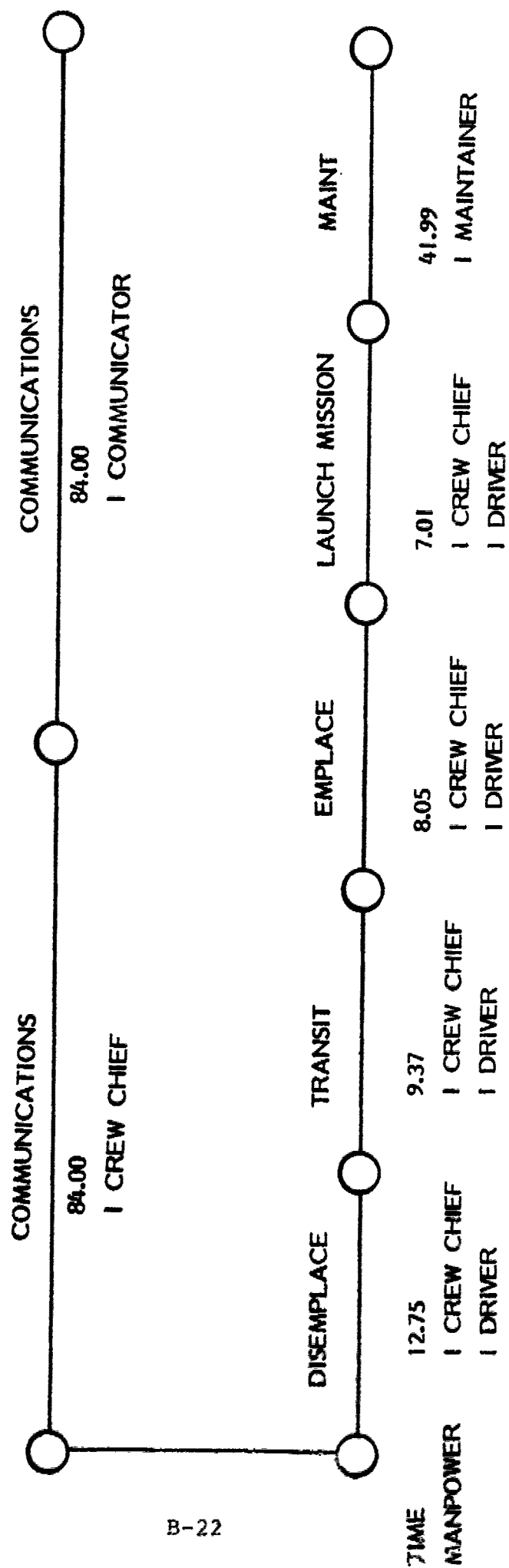


Figure B3-2. RSV Task/Event Network (Tracked Reference).

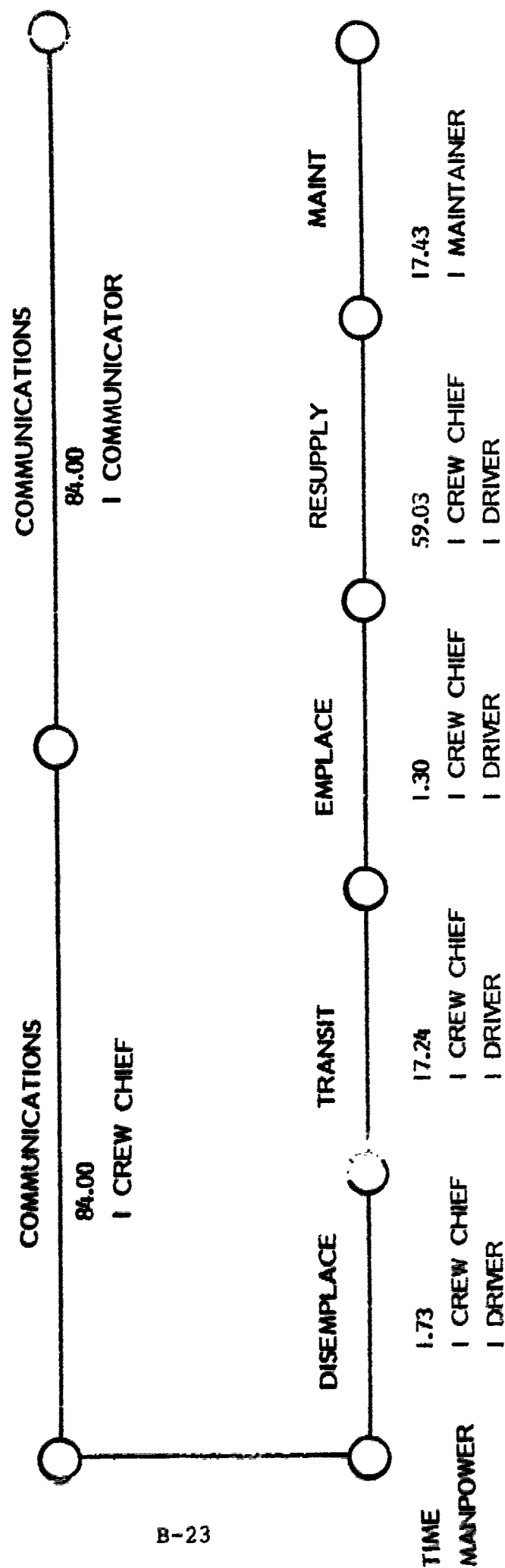


Figure B3-3. SPL Task/Event Network (Wheeled Reference).

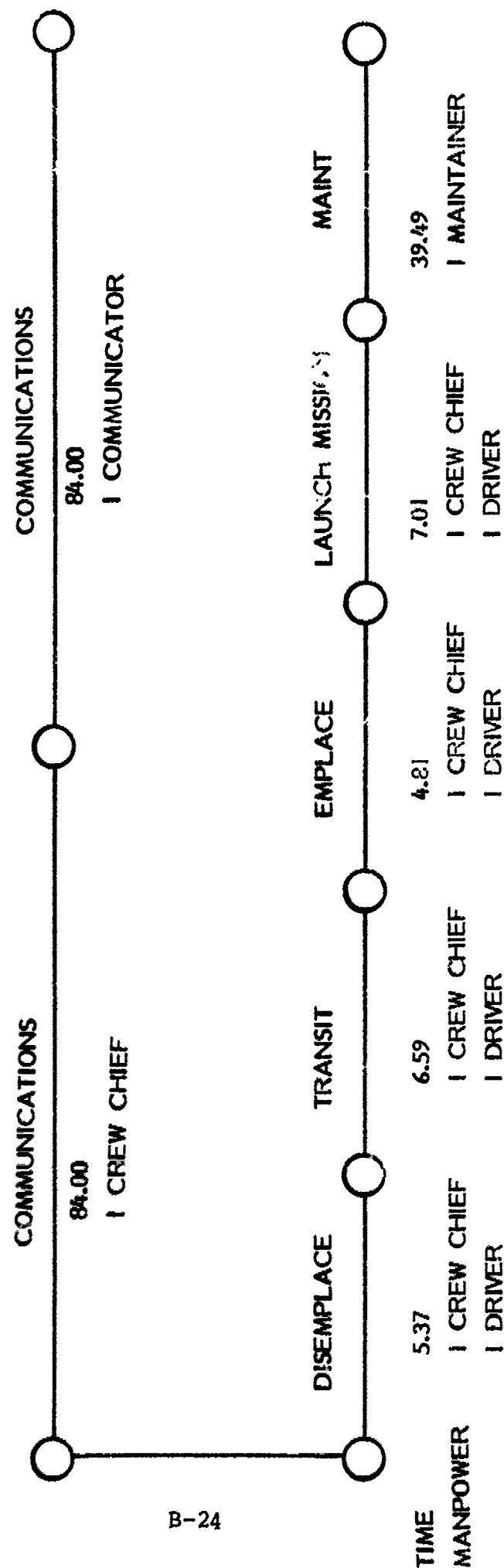


Figure B3-4. RSV Task/Event Network (Wheeled Reference).

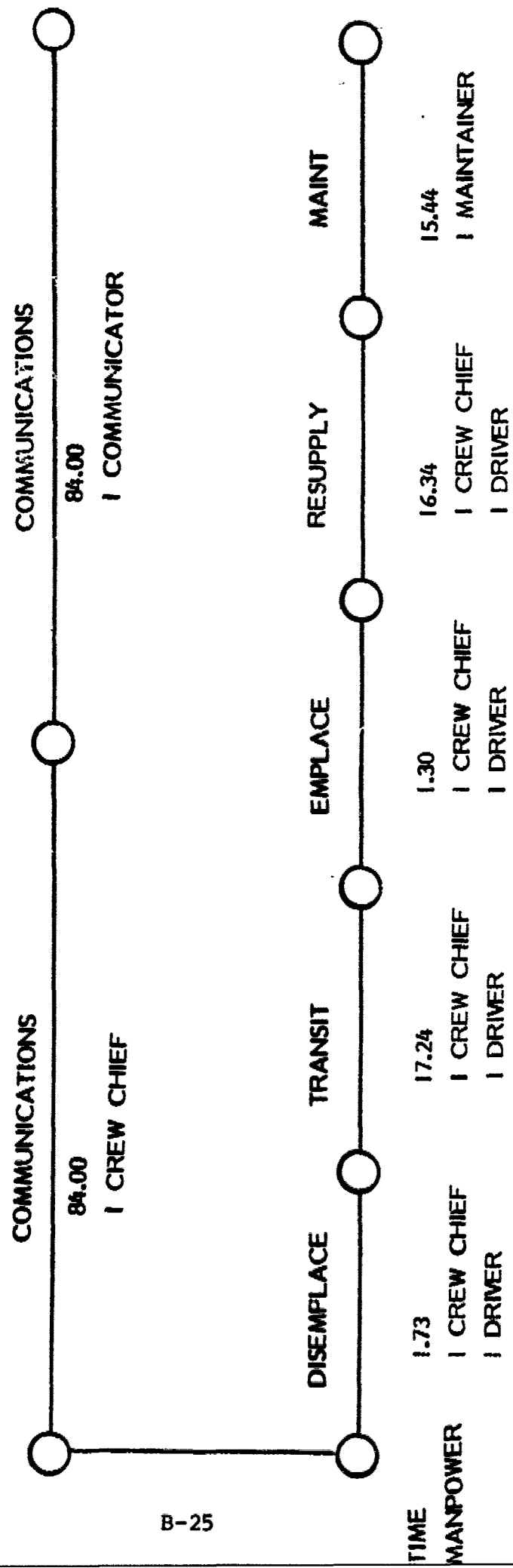


Figure B3-5. SPL Task/Event Network (1 LANCE).

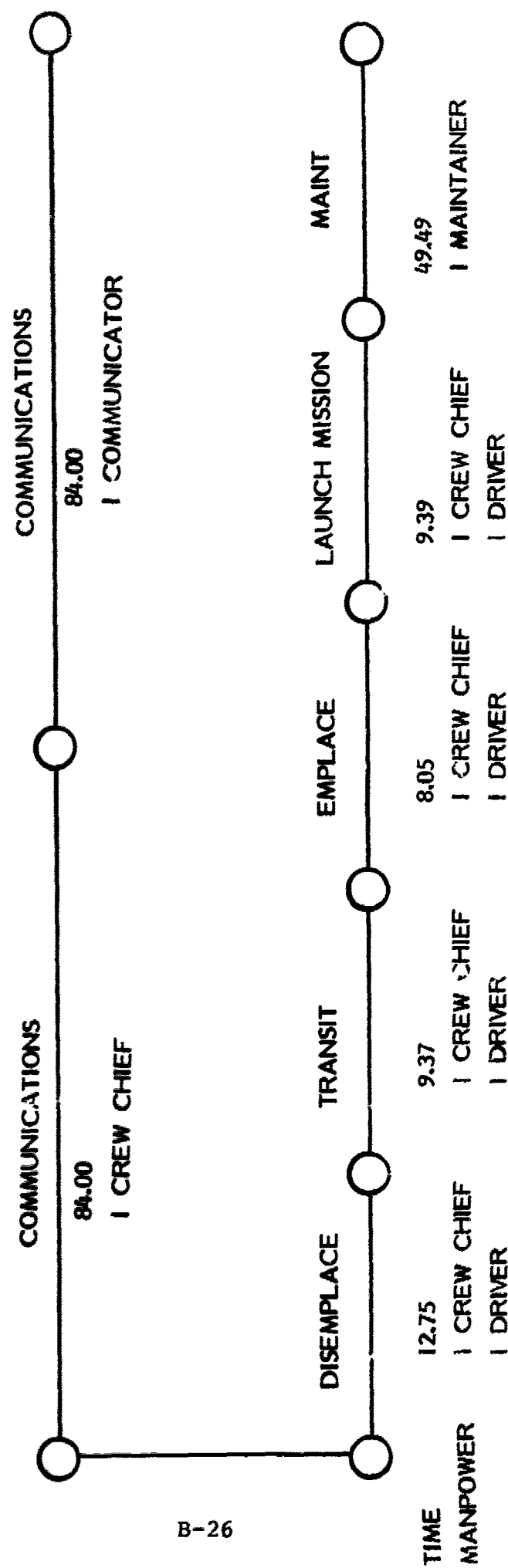


Figure B3-6. RSV Task/Event Network (LANCE).

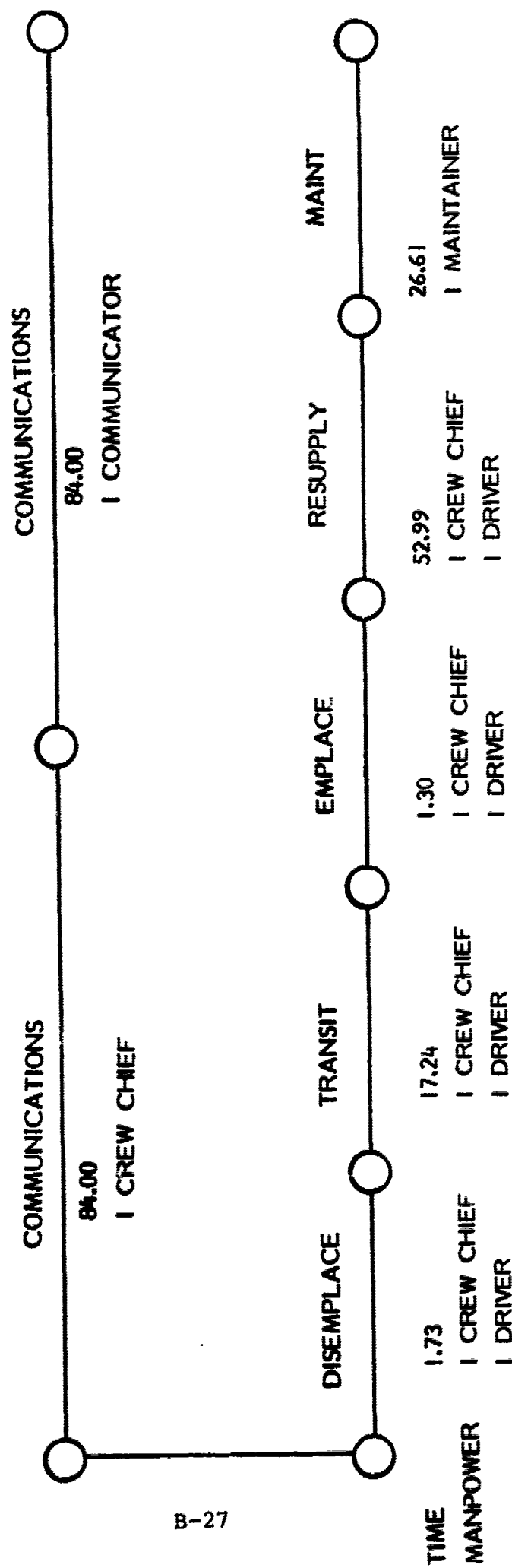


Figure B3-7. SPL Task/Event Network (MLIS).

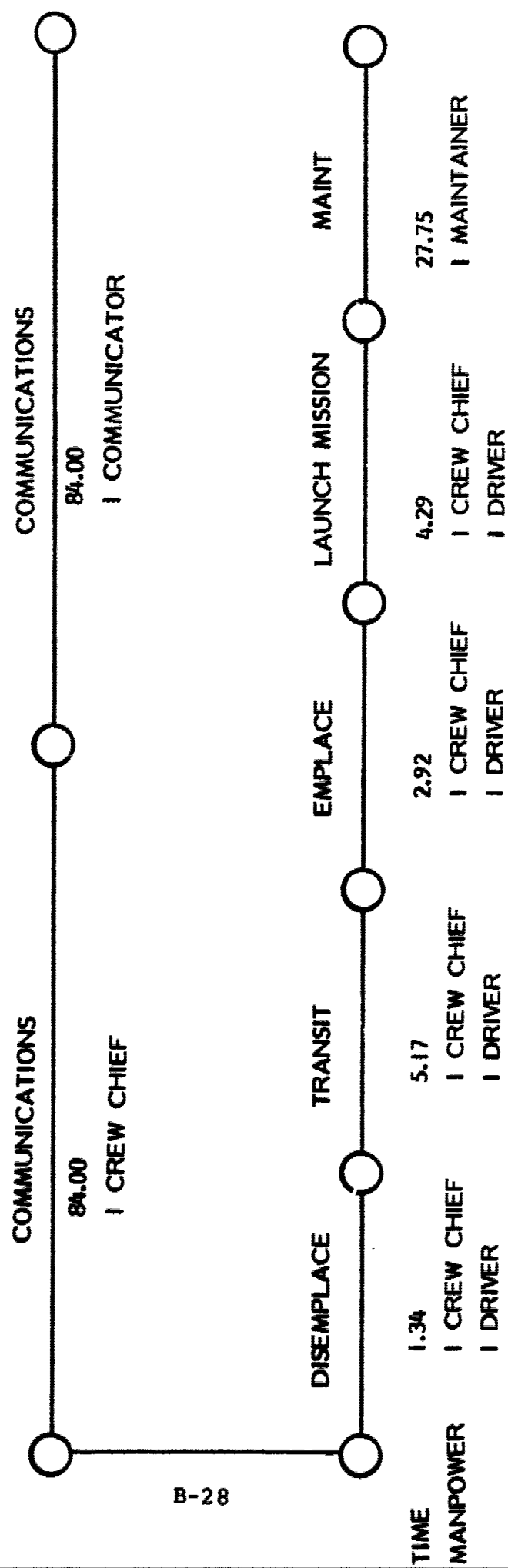


Figure B3-8. RSV Task/Event Network (MLIS).

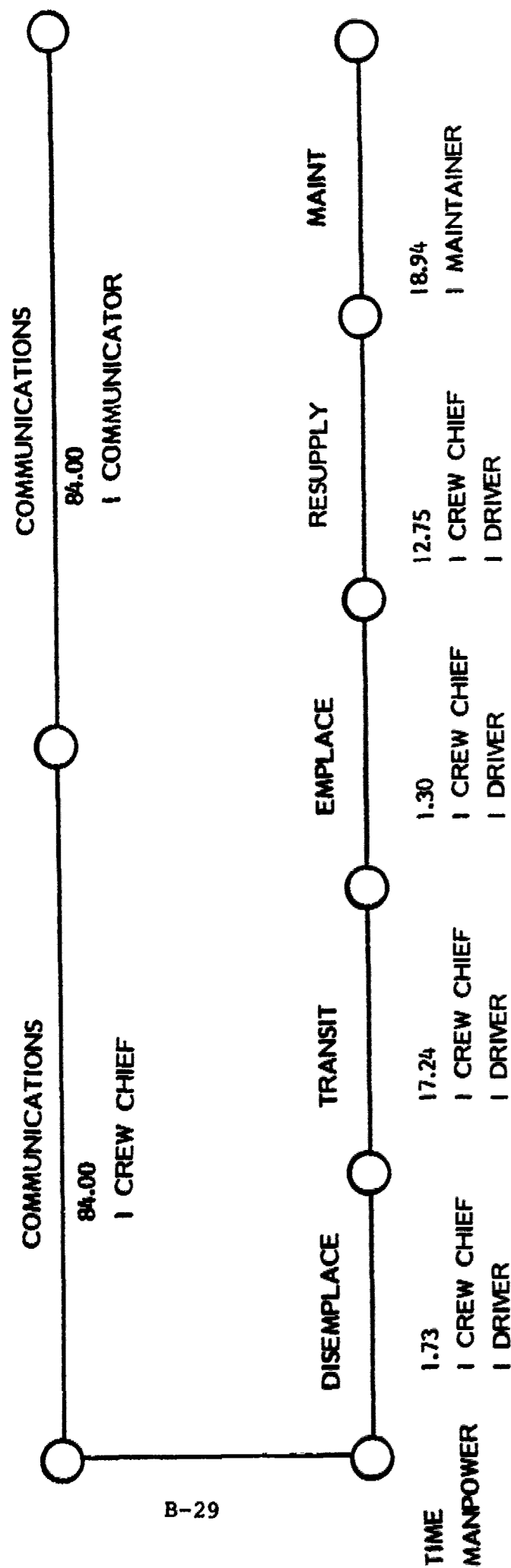


Figure B3-9. SPL Task/Event Network (LANCE II).

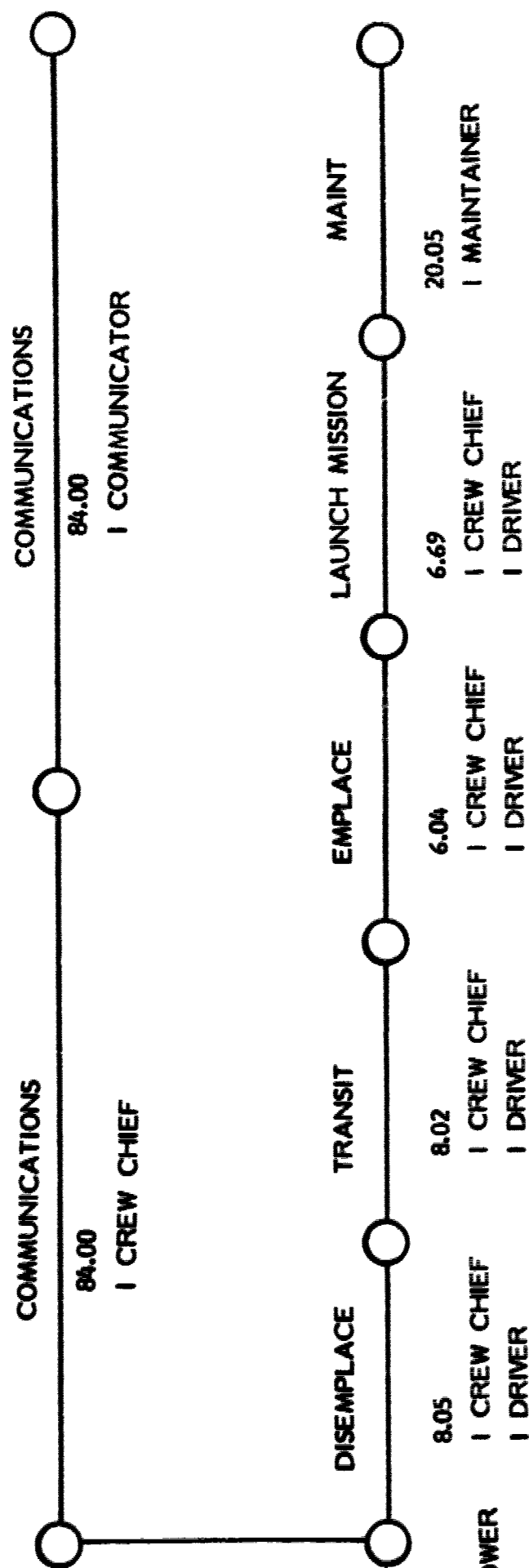
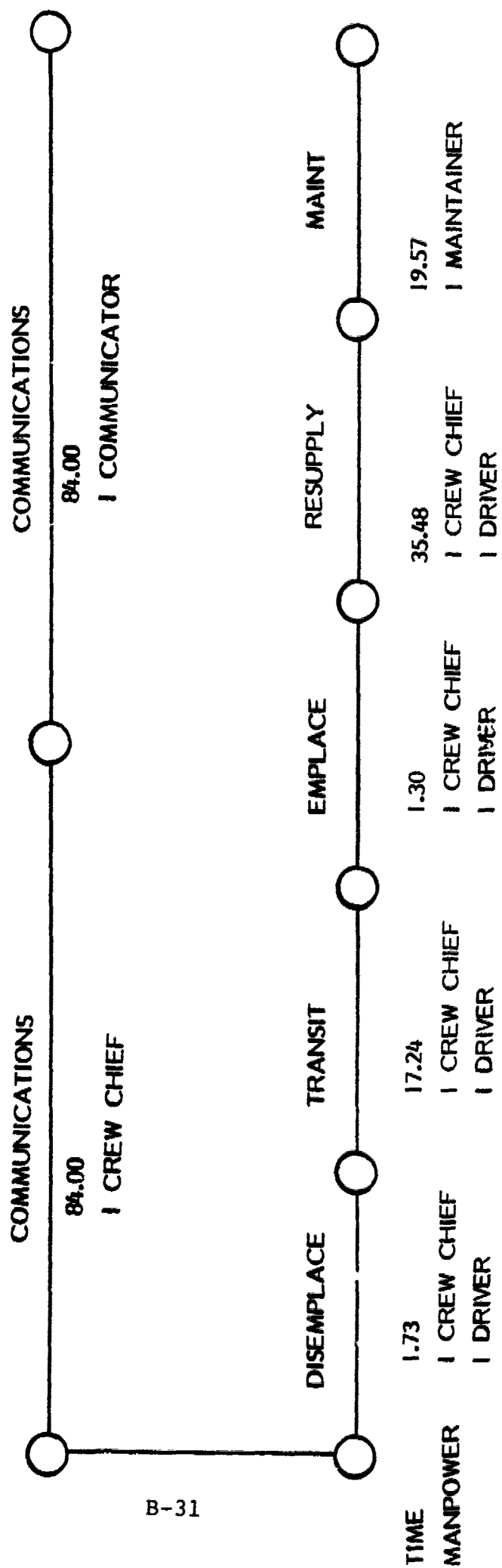


Figure B3-10. RSV Task/Event Network (LANCE II).



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APPENDIX C
TRAINING RESOURCE REQUIREMENTS ANALYSIS

APPENDIX 1
EQUIPMENT/COURSE MODULE WORKSHEETS

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APPENDIX C1
EQUIPMENT/COURSE MODULE WORKSHEETS

This appendix describes the worksheets that were used to document the equipment used to estimate training requirements and the sources of resident training that are available for this equipment. The appendix is divided into two sections. The first section contains the worksheets used for the operator training analysis and the second section contains those worksheets used for the maintenance training analysis.

The equipment/course module worksheet was used to plan the training analysis and to provide an audit trail between the generic equipment selected to comprise the reference system, the representative equipment selected for RAM analysis, the equipment chosen for the purpose of training estimation and the source(s) of formal school training programs. This documentation was provided for each comparable subsystem found in the reference and baseline systems.

The first column of the worksheet contains the functional group codes assigned to the generic reference equipment.

These codes were assigned in the engineering analysis and are found in Appendix A2.2.1. In some instances the codes were aggregated together to a point where meaningful MOS identifications and training programs were found. In still other cases more detailed group codes were used because distinct MOS and formal school training was found for individual subsystems below that needed for RAM analysis. For example, Radiac Set AN/PDR-27 is part of group code 2302, personnel protective equipment. Because it alone requires unique maintenance training and has MOS assignments different from other subsystems found within this group code, a more detailed group code used in earlier engineering analyses was assigned.

The second column contains the reference equipment that was chosen in the engineering analysis to provide RAM data, while the next column was used to record the equipment chosen for training estimation. In selecting equipment for either purpose, comparable equipment was chosen that met the generic functional requirements. Another important selection criteria was insuring that appropriate data for the equipment were available. Many differences in equipment are found between these two columns because the desired data were available for one purpose, but not for the other.

The next two columns were used to indicate where formal school training is found for the equipment selected for training estimation. Information recorded included (1) the course title, (2) the course number, and (3) the annex, file number, or objective containing the instruction.

The second half of the worksheet was used to record the same kind of information for the baseline systems as for the reference systems. The information for the three baseline systems was stacked on top of each other opposite the comparable reference systems and within the same group code.

The last column was used to record major training devices found within the courses of a group number. Training devices represent potential training cost high drivers and were recorded for later use in identifying training device requirements.

CI.1 OPERATOR EQUIPMENT/COURSE MODULE WORKSHEETS

Table CI-1 contains the equipment/course module worksheets for system operator analysis. The group codes for equipment in the operator analysis were grouped on the worksheets based on the major system functions identified in the functional analysis found in Appendix AI.1. This was done

Table C1-

SYSTEM/VEHICLE: SPL/RSV

Operation Task Area: Perform Communications

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2401	VHP-PM Radio Set (AN/ARC-131)	VRC-46 RT-524 R-442	Lance Operations/ Fire Direction Assistant 250-15J10	CE 430C CE 430J CE 430M	(1, 2, 3) SINCGARS IV	VRC-46	Same as Reference	Same as Reference	
2404	Digital Data Communications AN/NSW - 25 (SPL O. 1y)	Remote Control Set AN/GRA-39	Lance Operations Fire Direction Assistant 250-15J10	CE 430C	(1, 2, 3) PLRS, JTIDS		Exportable Training		
3204 3205	Weapon Control Indicator Panel	Same							
2403	Intercom Set (AIC-14)	Intercom Set AN/VIC-1	Lance Operations/ Fire Direction Assistant	CE430C	(1, 2, 3) AN/VIC-1		Same as Reference	Same as Reference	
2402	COMSEC Unit (VINSON TSBC/KY-57)	Same	Lance Operations Fire Direction Assistant	CC43VA CC43VB CC4302 CC43VE	(1, 2, 3) VANDAL KVU-4		Same as Reference	Same as Reference	

MIL COM

Table CL-1 (Con't.)

SYSTEM/VEHICLE: SPL
Operation Task Area: Perform Technical Fire Control

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
32	Fire Control System HARPOON	Same	HARPOON Weapon System Operation 5-113-0131 (Navy)	Units 2,3					
3204	Casualty Panel (C-10277)								
3205	Weapon Control Indicator Panel								
32	Fire Control System (MLRS Derivative)		Modified HARPOON Course Unit Descriptions and Times Based on MLRS. The large units of MLRS course Organization		(1,2,3) Fire Control System (MLRS Derivative) Remote Fire Unit	Same	13M MLRS Crewmember	061-310-2010 061-310-2020	
3205	Fire Control Panel				Fire Control Panel Assumed CSWS will include automated systems fault re-cognition software	Patriot	16F Patriot Missile Crew Member Course	RC5-4C206 Fault Recognition	

Table Cl-1 (Con't.)

SYSTEM/VEHICLE: SPL
Operation Task Area: Perform Shoot Function

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASLINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
32	Fire Control System Harpoon		HARPOON Weapon System Operation J113-0131 (Navy)	Units 2,3	(1,2,3)		153 Multiple Launch Rocket System Crew Member POI	061-310-2020 061-310-2050	
3205	Fire Control Panel		Lance Missile Crew Member 043-15D-10	WL65FA	Keyboard Assembly				
	Key Board Assembly								
	Plasma Panel				Plasma Panel				
3204	Remote Fire Unit		HARPOON Weapon System Operation J-113-0131 (Navy)	Units 2,3					
			Lance Missile Crewmember 043-15D-10	WL65FA					
32			Modified HARPOON Course Unit Descriptions Based on the large units of MLRS Course Descriptions		(1,2,3) Fire Control System (MLRS Derivative)	Same	13M MLRS Crewmember	061-310-2020 061-310-2050 061-310-2060	
3204					Remote Fire Unit				

Table CI-1 (Con't.)

SYSTEM/VEHICLE: SPL
Operation Task Area: Perform Vehicle Movement

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
<u>Continued from Perform Shoot Function</u>									
3205					Pire Control Panel Assumed CSWS will include system fault recognition software	PATRIOT	16T PATRIOT MISSILE Crewmember Course	RCS-40206 Fault Recognition	
0606	TRACKED				MLRS SPL	MLRS Carrier	13M-10/20 Multiple Launch Rocket System Deployment Course (Filler)	061-310-1420 061-310-1430	Driving Simulator
1804	Electrical Switches Transmission Shift Lever		043-15010 Lance Missile Crewman	None					
1805	Steering/Brake Control Assy.								
1808	Instrument Panel (Lance M657)								
0606	WHEELED								
1401	Electrical Switches		043-15010 Lance Missile Crewman	None	3) HEMTT M4977	Estimated Prom MARS Course RSV Drivers Training	13M-10/20 Multiple Launch Rocket System Deployment Course (Filler)	Not Identified As task but included in the course driver's instruction	Driving simulator
1804	Steering Wheel								
1805	Transmission Shift Lever								
1808	Brake Peddle Assy Instrument Panel (MAN 107)								
16	Suspension Lockout System. Suspension Lockout Control		Lance Missile Crewman 043-15010	ML65MB	MLRS	MLRS Carrier	13M-10/20 Multiple Launch Rocket System Deployment Course (Filler)	061-310-1010	Driving Simulator

MIL-OW

Table C1-1 (Con't.)

SYSTEM/VEHICLE: SPL
 Operator: Task Area: Perform Navigation

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASLINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2501	(Primary) Inertial Navigation Set (AN/ASN-92) Control and Display Unit	PADS AN/USQ 70	Survey Officers Course Lance Missile Crewman 043-15D10	AS07R1 AS07RJ AS07RN WL65 FA	(1,2,3) Inertial Navigation Set (ASN-110) Control and Display Unit Fire Control Panel	(1,2,3) Land Navigation System (USQ-70) PADS	Survey Officers Course	AS07R1 AS07RJ AS07RN	
1205									
2502	Land Navigation System (Alternative) Attitude Heading Reference System (ASN-107)	(1,2,3) PADS AN/USQ 70	Survey Officers Course Lance Missile Crewman 043-15D10 None	AS07R1 AS07RJ AS07RN WL65FA	(1,2,3)				
2404		Requires MAP Reading Skills and a survey team	None						
2503	Barometric Altimeter (AAU-19)								
2504	Distance Transmitter Unit		None						

MIL CW

Table CL-1 (Con't.)

SYSTEM/VEHICLE: SPZ

Operation Task Area: Perform Navigation (cont.)

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
3305	Fire Control Panel		NONE This system was treated as a complete system in the analysis. The majority of the training provided on the system will not be training on the operation of the system. It will be training addressing the use of system outputs while planning movement and moving.		HLAS	NONE	The fire control panel will provide the same navigational data when this system is used as the primary system. It is assumed that through software design differences will be transparent to the operator during system operation.		

Table C1-1 (Con't.)

SYSTEM/VEHICLE: SH/RSV

Operation Task: 12.0. Operate Environmental Control System

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
1907	Personnel Heater System Heater Controls		NONE				13410/20 Multiple Launch Rocket System Deployment Course	Driver's Training Annex A3	
23	Environmental Protection System		NONE				No training now given on these systems	Driver's Training Annex A3	
2301	Positive Pressure System Face Piece Test and Control Panel	ABC M25A1 Chemical Agent Detector (M8, 43) Radiac Set (AN/PDR-27)	Trained on M17 in 15D - OSUT NONE		Hybrid Collective Protection Equipment Ventilated Face Piece Test and Control Panel		Training included in Driver's training Will not require significant additional training		
2302	Personnel Protective Equipment M20 Oxygen Breathing Apparatus Clothing		NONE Trained in 15D OSUT				No Training Trained in 15XX OSUT		
2303	Fire Suppression System Test and Alarm Panel Personnel Decontamination Equipment (M11, M13, M25S)	HALON 1301	NONE			MLRS	13410/20 Multiple Launch Rocket System Deployment Course	Drivers Training Annex A3	

MIL CW 1

Table CL-1 (Con't.)

SYSTEM/VEHICLE: S L

Operation Task Area: Port to Missile Resupply

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
26	Missile Support Assembly	HARPOON Launch Fixture	HARPOON Canister team training 5113-0133 (NAVY)	Entire Course	(1) Same as Reference	(1,2,3) Same as Reference			
2601	Rear Tie down strap								
2602	Forward Tie down strap								
2603	(LANCE) WHS Cradle Support Assembly								
30	Launch fixture Latching/Tie down assembly	HARPOON Launch Fixture	HARPOON Canister team training 5113-0133 (NAVY)	Entire Course	(2,3) Same as Reference	(1,2,3) Same as Reference	(2,3) PATRIOT training was considered but rejected because of the lack of detailed course documentation		

MIL CW-3

C-13

MIL CW

Table C1-1 (Con't.)

SYSTEM/VEHICLE: RSV/TRAILER

Operation Task Area: Perform Missile Supply (cont.)

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
20	Winch and Crane System		LANCE Missile Crewmember	WL65MC WL65PO WL65ME	(1) Same as reference (2) (3)				
2001	Material Handling Crane Control Level Assembly LANCE		15D10-OSUT/043-15D10						
26	Missile Support Assy.	HARPOON Launch Fixture	HARPOON Canister team training	Entire Course	(1) LANCE		2,3 PATRIOT training was considered but rejected because of the lack of detailed course documentation		
2601	Rear Support Tie Down Assembly		J113-0133 (NAVY)						
2602	Front Support Tie Down Assembly								
2603	WHS Cradle Support Assembly				(2) MLIS (3) I LANCE				

Table Cl-1 (Con't.)

SYSTEM VEHICLE: RSV

Operation Task Area: Perform Vehicle Movement

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
0606	Electrical Switches	MAN 10-Ton	NONE		Electrical Switches	MLRS Resupply Vehicle	13M10/20 Multiple Launch Rocket System Deployment Course	Annex A3 Drivers Training	
14	Steering Wheel				Steering Wheel				
1804	Transmission Shift Lever				Transmission Shift	See Design Change 7			
1805	Brake Peddle Assembly				Brake Peddle Assembly				
1807	Instrument Panel (MAN 10-TON)				Instrument Panel (HEMTT)				

Table CL-1 (Con't.)

SYSTEM OPERATION
EQUIPMENT/COURSE MODULE WORKSHEET

SYSTEM/VEHICLE: MISTLE
Operation Task Area: Perform Missile Resupply

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
13	Missile Round (Lance)	Lance II	HARPOON Canister Team Training		Same	Same		WL65ME	
14	Canister (Lance) (Shipping and Storage)	Lance	HARPOON Canister Team Training		(2, 1) Missile Canister (Shipping and Storage)	Same	(2, 3) PATRIOT training was considered but rejected because of the lack of detailed course documentation		
					MLIS and Lance II treated the same because of canistered round				

MIL CW

to provide a functional context in which to analyze the affects of equipment design differences on the operation of the system. In addition, this functional context tends to follow closely the organization of operator courses of instruction.

Cl.2 MAINTENANCE EQUIPMENT/COURSE MODULE WORKSHEETS

Table Cl-2 contains the equipment/course module worksheets developed for system maintenance analysis. The group codes on these worksheets follow sequentially the original order developed in the engineering analysis. In this way all components of the various system configurations were tracked to insure that an MOS with maintenance responsibility for each component was identified and that representative training was found.

Within the course data columns of these worksheets, training information was broken down into the three echelons of maintenance required for the CSWS study: crew, organizational, and direct support. These three levels of maintenance were included for all reference and baseline systems.

Table C1-2

VEHICLE: SPI.

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
01, 04, 05, 07-22	TRACKED VEHICLE Carrier: M667	Same	Crew: 15D10 Lance Missile Crewman 043-15D10 ORG: 63Y10 Track Vehicle Mechanic 611-63Y10 D.S.: 63H10 Track Vehicle Repairer 611-63H10 Annex E: 63H1-E11 63H1-E44 63H1-E44 Annex F: 63H1-F23 Annex J: 63H1-J11	ML65PM	(1) M667	Same	Same as tracked reference	-	-
01, 04, 05, 07-22	WHEELED VEHICLE Carrier: M.A.N. 10 Ton	GOER M520	Crew: 15E10 Pershing Missile Crew Member 043-15E10 ORG: 63S10 Heavy Wheel Mechanic 610-63S10	None	(2) Infantry Fighting Vehicle XM2	M667	Same as tracked reference	-	-

MIL CW

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANEX/FILE NUMBER	TRAINING DEVICE
01, 04, 05, 07 - 22 (Cont'd)			D.S.: 63Y10 Wheel Vehicle Repairer 610-63Y10	None	(3) HEMTT XM977	COER M520	Same as Wheeled reference	-	-
0102, 01, 06	TRACKED VEHICLE Starter, Fuel System, Electrical System from M667	Same	Crew: 15D10 Lance Missile Crewman 043-15D10 ORG: 63Y10 Track Vehicle Mechanic 611-63Y10 D.S.: 63G10 Fuel & Electrical Systems Repairer 610-63G10	None None	(1) Starter, Fuel System, Electrical System from M667 (2) Starter, Fuel system, Electrical System from Infantry fighting vehicle XM2	Same Same from M667	Same as Tracked reference Same as Tracked reference	- -	- -

Table Cl-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
0102, 01, 06	WHEELSP VEHICLE Starter, Fuel System, Electrical System From M.A.N. 10 Ton	Starter, Fuel System, Electrical System from GDER M520	Crew: 15E10 Pershing Missile Crew Member 043-15E10 ORG: 6JS10 Heavy Wheel Vehicle Mechanic 610-6JS10 D.S.: 6JG10 Most of POI Fuel & Electrical Systems Repair 610-6JG10	None	(3) Starter, Fuel System Electrical System from HEMTT M4977	Same from GDER M520	Same as noted	-	-
23	Environmental Control System		Crew: No training found (NOTE:)	-	(1) Hybrid Collective Protection Equipment	M10	Same as reference	-	-
2101	Positive Pressure Equipment: From B-2 Aircraft	Collective Protection Equipment M10 from HAWK Battery Control Center	ORG: 63J10 Quatermaster and Chemical Equipment Repairer 690-63J10	None	(2) Hybrid Collective Protection Equipment (3) Hybrid Collective Protection Equipment	M10 M10	Same as reference Same as reference	- -	- -

NOTE: 1. No operator/crew maintenance training found for most of the NBC detection and protection equipment.

MIL CW 1

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2301 (Contd)			D.S.: 63J10 Quartermaster and Chemical Equipment Repairer 690-63J10	None					
230161	Ventilated Face Piece: Oxygen Mask from E-2 Aircraft	Protective Mask M2SA1	Crew: 15D10 Lance Missile Crewman 15D10-OSUT ORG: 63J10 Quartermaster and Chemical Equipment Repairer 690-63J10 C.S.: 63J10 Quartermaster and Chemical Equipment Repairer 690-63J10	Annex C: HWXXAD Annex E: 63J10-E-2 Annex E: 63J10-E-2	(1) M2SA1 (2) M2SA1 (3) M2SA1	Same Same Same	Same as reference Same as reference Same as reference	- - -	- - -

Table C1-2 (Con't.)

VEHICLE: SP1

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2302	Personnel Protective Equipment		Crew: No Training Found (Note 1)	--	(1) M43A1/42	M43	Same as reference	-	-
2302	Chemical Agent Detector: M43/42	Same	Org: 31V10 Tactical Comm. Sys. Oper/Mech 101-31V10	None	(2) M43A1/42*	M43	Same as reference	-	-
			D.S.: 31E10 Field Radio Repairer	Annex 1	(3) M43A1/42* *Additional training may be required due to workload & operational environment	M43	Same as reference	-	-
23023	Radiac Set: AN/PDR-27	Same	Crew: No Training Found (Note 1)	--	(1) AN/VDR-2*	AN/PDR-27	Same as reference	-	-
			Org: 31V10 Tactical Comm. System Operator/Mechanic 101-31V10	None	(2) AN/VDR-2*	AN-PDR-27	Same as reference	-	-
			D.S.: 35H10 Radiac Instrument Repair and Calibration JAZR 32470-000	9 hours See telephone Report	(3) AN/VDR-2* *Additional training may be required due to workload & operational environment	AN/PDR-27	Same as reference	-	-

NOTE 1: No operator/crew maintenance training found for most of the NBC detection and protection equipment.

MIL CH

Table CL-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASILINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2303	Personnel Decontamination Equipment: AHC M11	Same	Crew: 15D10	Annex C: HXXXAD	(1) AHC M11	Same	Same as reference	-	-
			Lance Missile Crewman 15D10-QSUT		(2) AHC M11		Same as reference		
			ORG: 54C10 Chemical Operations Specialist 494-54C10	54E10-E3	(3) AHC M11	Same	Same as reference	-	-
			D.S.: None				Same as reference		
23017	Air Conditioner: from E-2 Aircraft	18,000 BTU Air Conditioning Unit	Crew: No Training Found	-	(1) Air Conditioner from E-2 Aircraft	18,000 BTU Air Conditioning Unit	Same as Reference	-	-
			ORG: 52C10 Utilities Equipment Repairer 662-52C10		(2) Air Conditioner from E-2 Aircraft		Same as Reference		
			D.S.: 52C10 Utilities Equipment Repairer 662-52C10	Annex J: 52C10-J-010-010	(3) Air Conditioner from E-2 Aircraft	18,000 BTU Air Conditioning Unit	Same as Reference	-	-

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITL AND POI NUMBER	ANALX/FILE NUMBER	BASE LINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITL AND POI NUMBER	ANALX/FILE NUMBER	TRAINING DEVICE
2304	Fire Suppression System from B-2 Aircraft	*Manual CO2 System from M667	Crew: 15D10 Lance Missile Crewman 041-15D10 ORG: 63Y10 Track Vehicle Mechanic 011-63Y10	None	(1) HALON 1301 System (2) HALON 1301 System (3) HALON 1301 System	M667 System M667 System M667 System	Same as reference Same as reference Same as reference	- - -	- - -
		*No Fire Detectors or Automatic Fire Suppression system were found in any military vehicles	D.S.: 63J10 Quartermaster and Chemical Equipment Repairer 690-63J10	None					
24	Communication System	Radio Set AN/VRC-47	Crew: 15J10 Lance Operations/ Fire Direction Assistant 250-15J10 ORG: 31V10 Tactical Comm. Sys. Oper/Rech 101-31V10	Annex: B CE430C	Singcars - V Singcars - V Singcars - V	AN/VRC-47 AN/VRC-47 AN/VRC-47	Same as reference Same as reference Same as reference	- - -	- - -
2401	VHF-FM Radio Set: ARC-141 From CH-46 Helicopter			Annex II CR2610B CR2610H CR2610C CR 2610J CR2610E CR 2610K CR2610F CR 2610L CR2610G CR2610M CR2610I CR2610P					

CR2619

MIL CW 1

Table C1-2 (Con't.)

VEHICLE: SP1

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/P-11 NUMBER	BASLINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/P-11 NUMBER	TRAINING DEVICE
2401 (Cont'd)			DS: 31E10 Field Radio Repairer 101-31E20	Annex E: E01 E02 E03 E04					
2402	COURSE: 31E10 755C/KY-79 F-105-46 Helicopter	VINSON TSR/KY-79	View: 31E10 Labor Operations/ Fire Direction Assistant 250-31E10 ORG: 31V10 Tactical Comm SYS Oper/Mech 101-31V10 D.S.: 31E10 Field General COMSEC Repairer 260-31E10	Annex B: CC410A CC410B Annex J: CR263B CR263C CR263D CR263E Annex C: C01 C02 C-4	(1) VANDAL KVV-4 (2) VANDAL KVV-4 (1) VANDAL KVV-4	VINSON KY-57 VINSON KY-57 VINSON KY-47	Same as reference Same as reference Same as reference	- - -	- - -
2403	Intercom Set: ALC-14 F-105-46 Helicopter	AN/VIC-1	View: 31E10 Labor Operations/ Fire Direction Assistant 250-31E10 ORG: 31V10 Tactical Comm SYS Oper/Mech 101-31V10	Annex B: CC410A CC410B Annex J: CR263B CR263C CR263D CR263E Annex C: C01 C02 C-4	(1) AN/VIC-1 (2) AN/VIC-1 (1) AN/VIC-1	AN/VIC-1 AN/VIC-1 AN/VIC-1	Same as reference Same as reference Same as reference	- - -	- - -

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2403 (Cont'd)			DS: 31S10 Field General CONSEC Repairer 160-31S10	None					
24031	Personnel Helmet: Air Crewman Personnel Helmet From E-2 Aircraft	Combat Vehicle Crewman (CVC) Helmet	Crew: No Training Found ORG: 31V10 Critical Comm Sys Oper/Mech 101-31V10 D.S.: None	None	(1) CVC (2) CVC (3) CVC	CVC CVC CVC	Same as Reference Same as Reference Same as Reference	- - -	- - -
2404	Digital Communications Set: AN/ASW-25 From E-2 Aircraft	AN/ASW-25	Crew: No Training Found Org: (Note 1) D.S.: Navy Course AN/ASW-25 A/B Digital Data Communications System C-102-3015	Unit 1 Unit 2: Topic 1 Unit 3: Topic 1 Topic 5 Topic 6 Unit 4	(1) PLRS/JTIDS Hybrid	AN/ASW-25, Data Conversion Unit From Harpoon Weapon System, and Radio Set AN/ARC-114 (Note 3)	Crew: (Note 2) Org: (Note 2) D.S. Navy Course AN/ASW-25 A/B Digital Data Communi- cations C-104	- - Unit 1 Unit 2: Topic 1 Unit 3: Topic 1 Topic 5 Topic 6 Unit 4	- - -

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2404 (Contd)		Radio Set AN/ARC-114 (AN/ASW-25 does not have a transmitter. Only the transmitter component is taken from AN/ARC-114.)	Crew: No Training Found Org: 35K10 Avionic Mechanic Course 102-35K10	Annex A: A09			Plus: Navy Course Harpoon Weapon System (Surface Application) Maintenance J-113-0127	Lesson Topic 3.9	-
			D.S.: 35L10 Avionic Communications Equipment Repair 102-35L10	Annex G: G01 G02 G03 G04			Plus: 35L10 Avionic Communications Equipment Repair 102-35L10	Annex G G01 G02 G03 G04	-
					(2) PLRS/JTIDS Hybrid	Same as Baseline 1	Same	Same	-
					(3) PLRS/JTIDS Hybrid	Same as Baseline 1	Same	Same	-

NOTES:

- Organizational maintenance training was used from only the AN/ARC-114 so as not to duplicate troubleshoot and remove/replace tasks.
- The individual-collective training plan for PLRS does not identify any formal school training requirements for operator/crew and organizational maintenance.
- The data conversion unit from the Harpoon weapon system was added to the baselines in order to achieve the three week direct support training requirement identified by the individual-collective training plan for PLRS.

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
25 2501	Navigation System: Inertial Navigation Set: AN/ASN-92 From E-2 Aircraft	PADS AM/USQ-70	Crew: 82C10 Artillery Survey Specialist 412-82C10 Org.: 35E10 Special Electronic Devices Repairer 198-35E10 D.S.: 35E10 Special Electronic Devices Repairer 198-35E10	AS32RI Annex J Annex J	(1) PADS (2) PADS (3) PADS	Same Same Same	Same as reference Same as reference Same as reference	- - -	- - -
2502	Attitude Heading Reference Set: AN/ASN-107 From S-3 Aircraft	Stability Augmentation System: AH-1G SAS Amplifier or AH-1S Directional Gyro: CN-998/ASN (Part of AN/ASN-43 Gyro System)	Crew: No Training Found Org: 35K10 Avionics Mechanic 102-35K10 D.S.: 35M10 Avionic Navigation and Flight Control Equipment Repair 102-35M10	- Annex B: B04 Annex J: J10 J11 J12 Annex K	(1) LR-80 (2) LR-80 (3) LR-80	AH-1G/AH-1S CN-998/ASN AH-1G/AH-1S CN-998/ASN AH-1G/AH-1S CN-998/ASN	Same as Reference Same as reference Same as reference	- - -	- - -

MIL-CW-1

Table C1-2 (Con't.)

VEHICLE: SPI.

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
2503	Barometric Altimeter: AAU-19	Same	Crew: No Training Found Org: No Training Found D.S.: No Training Found	-	(1) None (2) None (3) None	-	-	-	-
26	Missile Support Assembly: M752	Same	Crew: 15D10 LANCE Missile Crewman 043-15D10 Org: AS123 LANCE Missile Mechanic 043-F4 D.S.: 63H10 Track Vehicle Repairer 611-63H10	None None None	(1) M752 Missile Support Assembly (2) None (3) None	Same	Same as reference - -	- - -	- - -

Table C1-2 (Con't.)

VEHICLE: SPI

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILL NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
30	Launch Fixture: M752	Same	Crew: 15D10 LANCER Missile Crewman 043-15D10 Org: AS123 LANCER Missile Mechanic 043-F4 D.S.: 63H10 Track Vehicle Repairer 611-63H10 Also: 45L10 Artillery Repairer 642-45L10 (M740 Zero Length Guided Missile Launcher) (Note 2)	Annex D: WL65PM Annex A: WL640D None None	(1) LANCE Launch Fixture M752 (2) HARPOON Derivative (3) HARPOON Derivative	Same *Patriot Launcher Mechanical Assembly	Same as reference Crew: 16T10 Patriot Missile Crew Member No Course Number Org: 24T10 Patriot System Mechanic No Course Number D.S.: 45L10 Artillery Repairer 642-45L10 (Note 1) Crew: 16T10 Patriot Missile Crew Member No Course Number	- Operator Preventive Maintenance Task: RC 5.40707 Difficult to Determine if Applies None None Operator Preventive Maintenance Task: RC 5.40707 Difficult to Determine if Applies	- - - -

MIL 15-1

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
							Org: 24710 Patriot System Mechanic No Course Number	None	-
							D.S.: 45L10 Artillery Repairer 642-45L10 (Note 1)	None	-
3001	Batteries: M752	Same	Crew: 15D10 LANCE Missile Crewman 043-15D10 Org: AS123 LANCE Missile Mechanic 043-F4 D.S.: 27B10 LCSS Test Specialist/LANCE Repairer 121-27B10	Annex D: WL65PM None Annex B: 27B1-210 27B1-211	(1) Batteries: M752 (2) Batteries: M752 (3) Batteries: M752	Same Same Same	Same as reference Same as reference Same as reference	- - -	- - -
NOTES: 1. Direct support maintenance training for Patriot has not been developed. 2. The lack of proper direct support maintenance of the LANCE M752 launch fixture has been identified as a problem. A new LANCE-specific maintenance MOS has been proposed.									

Table C1-2 (Con't.)

VEHICLE: SPL

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
11	Launcher Drive System: ASROC MK-112	Gun Mount 5"/54 MK42 MOD 9 & 10	Crew: No Training Found Orig: Navy Course Gun Mount 5"/54 MK42 MOD 9 & 10 A-113-0044 D.S.: Navy Course Gun Mount 5"/54 MK42 MOD 9 & 10 A-113-0044	- Lesson Topics 16.1 - 16.9 Lesson Topics 16.1 - 16.9	(1) MLRS Derivative (2) MLRS Derivative (3) MLRS Derivative	MK42 *MK42 *MK42	Same as reference Same as reference Same as reference	- - -	- - -
32	Fire Control System: HARPOON Weapon System	Same	Crew: Navy Course HARPOON Weapon System (Canister Configuration) Operation J-113-0131 Orig: Navy Course HARPOON Weapon System (Surface Application) Maintenance J-113-0127	Unit 3 Lesson/Topic 3.1 Unit 3	(1) MLRS Derivative (2) MLRS Derivative (3) MLRS Derivative	HARPOON Fire Control System HARPOON Fire Control System HARPOON Fire Control System	Same as reference Same as reference Same as reference	- - -	- - -

MIL CW

Table Cl-2 (Con't.)

EQUIPMENT/COURSE MODULE WORKSHEET

VEHICLE: SPL

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
32 (Contd)			D.S.: Navy Course HARPOON Weapon System (Surface Application) Maintenance J-113-0127	Unit 3					
33	VEHICLE/SYSTEM: MISSILE Missile Round: *LANCE GM52C *Certified - Round Concept	Same	Crew: 15D10 LANCE Missile Crewman 043-15D10 Org: AS123 LANCE Missile Mechanic 043-F4 D.S.: 27B10 LCSS Test Specialist/LANCE Repairer 121-27B10	Annex D: WL65ME Annex A: WL640H Annex B: 27B1-205 27B1-206 27B1-207 27B1-209 27B1-215	(1) LANCE II Missile (2) MLIS Missile	*LANCE GM52C MLRS Missile	Same as reference Crew: 13M10 MLRS Crewman Filler 000-13M10 Org: 13MS8 MLRS Mechanic 000-13MS8 D.S.: Same as reference Same as reference	- None None -	DVC 06-52 Guided Missile Training (LANCE) M25

Table Cl-2 (Con't.)

VEHICLE/SYSTEM: MISSILE

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
34	Missile Canister: LANCE M599 (Shipping & Storage Container)	Same	Crew: 15D10 LANCE Missile Crewman 043-15D10 Org: AS123 LANCE Missile Mechanic 043-P4 D.S.: 27B10 LCSS Test Specialist/LANCE Repairer 121-27B10 Also: Navy HARPOON Weapon System (Surface) Application Maintenance J-113-0127	None	(1) LANCE M599 (2) Missile Canister: Patriot	Same Same	Same as reference Crew: 16T10 Patriot Missile Crew Member No Course Number Org: 24T10 Patriot System Mechanic No Course Number D.S.: 27B10 LCSS Test Specialist/LANCE Repairer 121-27B10 Crew: 16T10 Patriot Missile Crew Member No Course Number Org: 24T10 Patriot System Mechanic No Course Number D.S.: 27B10 LCSS Test Specialist/LANCE Repairer	- None RC 4.11508 None None None RC 4.11508 None	- - - - - -

121-27B10

MIL CW-1

Table CL-2 (Con't.)

VEHICLE: RSV

EQUIPMENT/COURSE MODULE WORKSHEET

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND FOR EQUIPMENT	ANNEX/FILE NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND FOR EQUIPMENT	ANNEX/FILE NUMBER	TRAINING DEVICE
01-16, 18, 22	Cattlet M.A.N. 10-Ton	GOER M520	Crew: 15540 Personnel Missile 043-15510	None	(1) HEMTT M985	GOER M520	Same as reference	-	-
			ORG: 63S10 Heavy Wheel Vehicle Mechanic 610-63S10	None	(2) HEMTT M985	GOER M520	Same as reference	-	-
			D.S.: 63W10 Wheel Vehicle Repairer 610-63W10	None	(3) HEMTT M985	GOER M520	Same as reference	-	-
20	Winch & Crane System: M39 Handling Unit	Same Other handling units with course and maintenance training: • M553 Wrecker (10-Ton) 6JS10 None • M816 Wrecker (5-Ton) 6JW10 None • M88A1 Recovery vehicle 63H10 None • M578 Recovery vehicle 63Y10 troubleshoot hydraulic system	Crew: 15D10 Lance Missile Crewman 043-15D10 ORG: ASI 23 Lance Missile Mechanic 043-F4 D.S.: 63H10 Track Vehicle Repairer 611-63H10 (Note 1)	Annex D: WL65P0 Annex A: WL640E None	(1) HIAB 870 (2) HIAB 870 (3) HIAB 870	M39 M39 M39	Same as reference Same as reference Same as reference	- - -	- - -

MIL CV

Table CI-2 (Con't.) EQUIPMENT/COURSE MODULE WORKSHEET

VEHICLE: RSV

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	BASIS/INT EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILE NUMBER	TRAINING DEVICE
20 (Contd)		M88A1 Recovery vehicle 63Y10 trouble-shoot hydraulic system							
23	Same as SPL								
24	Same as SPL except no Digital Data Communications Set								
26	Missile Support Assembly: M688	Same	Crew: 15D10 Lance Missile Crewman 043-15D10 ORG: AS123 Lance Missile Mechanic 043-F4 D.S.: 63H10 Track Vehicle Repairer 611-63H10	None	(1) M688 (2) None (3) None	Same None None	Same as Reference - -	- - -	- - -

NOTE:

1. The lack of proper direct support maintenance of the Lance M39 Handling Unit has been identified as a problem. A new Lance-specific maintenance MOS has been proposed.

MIL (TW)

Table C1-2 (Con't.)

EQUIPMENT/COURSE MODULE WORKSHEET

VEHICLE: RSV TRAILER

GROUP NUMBER	REFERENCE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILI NUMBER	BASELINE EQUIPMENT	REPRESENTATIVE EQUIPMENT FOR TRAINING ESTIMATION	COURSE TITLE AND POI NUMBER	ANNEX/FILI NUMBER	TRAINING DEVICE
06-16, 22	None	GOER M520 Trailer	Crew: 15E10 Perishing Missile Crew Member 043 15E10 ORG: 63S10 Heavy Wheel Vehicle Mechanic 610-61S10 D.S.: 6JW10 Wheel Vehicle Repairer 610 6JW10	None	(1) HEMAT M989 (2) HEMAT M989 (3) HEMAT M989	GOER M520 Trailer GOER M520 Trailer GOER M520 Trailer	Same as reference Same as reference Same as reference	- - -	- - -
26	Missile Support Assembly: M752	Same	Crew: 15D10 Launch Missile Crewman 043-15D10 ORG: AS123 Launch Missile Mechanic 043-P4 D.S.: 6JH10 Track Vehicle Repairs 611-6JH10	None	(1) Missile Support Assembly M752 (2) None (3) None	Same - -	Same as reference - -	- - -	- - -

MIL CV

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APPENDIX C2
MOS ASSIGNMENTS

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APPENDIX C2

MOS ASSIGNMENTS

C2.1 SUMMARY OF CSWS MOS AND ASI ASSIGNMENTS

A list of all the CSWS MOS and ASI is found in Table C2-1. Altogether there were 15 MOS and 1 ASI that were identified to have responsibility for the operation and maintenance of the Corps Support Weapon System.

Of the MOS and the ASI identified, only 1 MOS and the ASI are new. The new MOS is CSWS Crewmember (15XX) while the new ASI is CSWS Mechanic (ASIXX). Section 5.2.2 gives an explanation of the MOS selection criteria.

C2.2 SUMMARY OF MOS ASSIGNMENTS BY EQUIPMENT

Table C2-2 contains all of the MOS required for the CSWS equipment configurations. The group numbers on the worksheets are the same as those found on the maintenance equipment/course module worksheets (Table C1-2). The worksheets and the MOS assignment table are intended to be used closely together.

Table C2-1. Summary of CSWS MOS and ASI Assignments.

<u>MOS</u>	<u>TITLE (With Abbreviation)</u>
15XX	CSWS Crewmember (*)
ASIXX	CSWS Mechanic (*)
27B	Land Combat Support Test Specialist/LANCE Repairer (LCSS Test Sp/LANCE Rep)
31E	Field Radio Repairer (*)
31S	Field General COMSEC Repairer (Field Gen COMSEC Rep)
31V	Tactical Communications Systems Operator/Mechanic (Tac Comm Sys Op/Mech)
35E	Special Electronic Devices Repairer (Sp Elec Devices Rep)
35H	Calibration Specialist (*)
52C	Utilities Equipment Repairer (Utilities Equip Rep)
54E	NBC Specialist (*)
63G	Fuel and Electrical Systems Repairer (Fuel & Elec Sys Rep)
63H	Track Vehicle Repairer (Track Veh Rep)
63J	Quartermaster and Chemical Equipment Repairer (QM & Chem Equip Rep)
63S	Heavy Wheel Vehicle Mechanic (Hvy Wveh Mech)
63W	Wheel Vehicle Repairer (Wveh Rep)
63Y	Track Vehicle Mechanic (Track Veh Mech)

*Indicates no abbreviation.

Table C2-2. Summary of MOS Assignments by Equipment.

GROUP NUMBER(S)	EQUIPMENT	REFERENCE												BASELINE											
		TRACKED				WHEELED				I LANCE				MLIS				LANCE II							
		C	O	F	C	O	F	C	O	F	C	O	F	C	O	F	C	O	F	C	O	F	C	O	F
SPL:		15XX	63Y	63H	15XX	63S	63W	15XX	63Y	63H	15XX	63Y	63H	15XX	63Y	63H	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
01,04,05,07-22	Carrier	15XX	63Y	63G	15XX	63S	63G	15XX	63Y	63G	15XX	63Y	63G	15XX	63Y	63G	15XX	63S	63G	15XX	63S	63G	15XX	63S	63G
0102,03,06	Fuel & Electrical Systems	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2301	Positive Pressure Equip.	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
230161	Ventilated Face Piece	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
23017	Air Conditioner	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
230231	Chemical Detector	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
230232	Radiac Set	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2303	Personnel Decontamination	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2304	Fire Suppression	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2401	VHF-FM Radio Set	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2402	Comsec Unit	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2403	Intercom Set	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
24031	Personnel Helmet	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2404	Digital Communications	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2501	Inertial Navigation	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2502	Attitude Heading Ref. Set	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
2503	Barometric Altimeter	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
26	Missile Support Assembly	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
30	Launch Fixture	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
30011	Batteries	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
31	Launcher Drive System	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
32	Fire Control System	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
33	Missile Round	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
34	Missile Canister	15XX	63Y	63J	15XX	63S	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63Y	63J	15XX	63S	63J	15XX	63S	63J	15XX	63S	63J
RSV:		15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
01-18,22	Carrier	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
20	Winch & Crane System	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
23	Environmental Control	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
24	Communication System	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
26	Missile Support Assembly	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
Trailer:		15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
06-16,22	Chassis	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W
26	Missile Support Assembly	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W	15XX	63S	63W

Basically, the worksheets document all of the normal course training that is available for each equipment component by maintenance echelon, while Table C2-2 indicates to what MOS the training is to be assigned. Where the source of training and the MOS assignment are the same or where no training source was found or training required, there is no additional training needed. However, if there is training found and the source of that training is different from the MOS assignment, additional training will need to be developed.

C2.3 EQUIPMENT ASSIGNED TO EACH MOS

Table C2-3 contains a breakdown of all the CSWS maintenance MOS and the equipment that the MOS has responsibility for. Included on the table is (1) an indication of the end item that the equipment is part of, (2) its assigned group number taken from the equipment/course module worksheets described in Appendix C1.1, and (3) which system configuration the equipment is found in.

Table C2-3. Equipment Assigned to Each MOS.

<u>MOS</u>	<u>END ITEM (S)</u>	<u>GROUP NUMBER(S)</u>	<u>EQUIPMENT</u>	<u>REMARKS</u>
15XX	S	26	Missile Support Assembly	Except MLIS and LANCE II
ASIXX	S	30	Launch Fixture	
	S	30011	Batteries	
	S	31	Launcher Drive System	
	S	32	Fire Control System	
	S	33	Missile Round	
	S	34	Missile Canister	
	R	20	Winch & Crane System	
	R&T	26	Missile Support Assembly	Except MLIS and LANCE II
27B	S	30011	Batteries	
	S	32	Fire Control System	
	S	33	Missile Round	
	S	34	Missile Canister	
31E	S&R	230231	Chemical Detector	
	S&R	2401	VHF-FM Radio Set	
	S&R	2403	Intercom Set	
	S	2404	Digital Communications	
31S	S&R	2402	Comsec Unit	

Table C2-3. (Continued).

<u>MOS</u>	<u>END ITEM(S)</u>	<u>GROUP NUMBER(S)</u>	<u>EQUIPMENT</u>	<u>REMARKS</u>
31V	S&R S&R S&R S&R S&R S&R S	230231 230232 2401 2402 2403 24031 2404	Chemical Detector Radiac Set VHF-FM Radio Set Comsec Unit Intercom Set Personnel Helmet Digital Communications	
35E	S S S	2501 2502 2503	Inertial Navigation Attitude Heading Ref. Set Barometric Altimeter	
35H	S&R	230232	Radiac Set	
52C	S&R	23017	Air Conditioning	
54E	S&R	2303	Personnel Decontamination	
63G	S&R S&R S&R	0102 03 06	Starter Fuel System Electrical System	
63H	S S S S	01,04,05, 07-22 26 30 31	Carrier Missile Support Assembly Launch Fixture Launcher Drive System	Except wheeled reference and LANCE II Except wheeled reference Except wheeled reference and LANCE II Except wheeled reference and LANCE II

Table C2-3. (Continued).

<u>MOS</u>	<u>END ITEM (S)</u>	<u>GROUP NUMBER (S)</u>	<u>EQUIPMENT</u>	<u>REMARKS</u>
63J	S&R	2301	Positive Pressure Equipment	
	S&R	230161	Ventilated Face Piece	
	S&R	2304	Fire Suppression	
63S	S	01,04,05, 07-22	Carrier	Except tracked vehicles
	S	0102	Starter	
		03	Fuel System	Except tracked vehicles
		06	Electrical System	Except tracked vehicles
	S	2301	Positive Pressure Equipment	Except tracked vehicles
	S	2304	Fire Suppression	Except tracked vehicles
	R&T	01,04,05, 07-22	Carrier	
	R	0102	Starter	
	R	03	Fuel System	
	R	06	Electrical System	
	R	2301	Positive Pressure Equipment	
	R	2304	Fire Suppression	

Table C2-3. (Continued).

<u>MOS</u>	<u>END ITEM (S)</u>	<u>GROUP NUMBER(S)</u>	<u>EQUIPMENT</u>	<u>REMARKS</u>
63W	S	01,04,05, 07-22	Carrier	Except tracked vehicles
	S	26	Missile Support Assembly	Wheeled reference only
	S	30	Launch Fixture	Except tracked vehicles
	S	31	Launcher Drive System	Except tracked vehicles
	R&T	01,04,05, 07-22	Carrier	
	R	20	Winch & Crane System	
63Y	R&T	26	Missile Support Assembly	Except MLIS and LANCE II
	S	01,04,05, 07-22	Carrier	Except wheeled vehicles
	S	0102	Starter	Except wheeled vehicles
	S	03	Fuel System	Except wheeled vehicles
	S	06	Electrical System	Except wheeled vehicles
	S	2301	Positive Pressure	Except wheeled vehicles
	S	2304	Fire Suppression	Except wheeled vehicles

Abbreviation code for system(s):

S = Self-Propelled Launcher
R = Resupply Vehicle
T = Trailer

C2.4 SUMMARY OF MOS ASSIGNMENTS BY SYSTEM

Table C2-4 is a summary of the CSWS MOS by system and end item. Six MOS were affected by design differences in the various equipment configurations. The MOS affected are identified by asterisks on the table. The remaining 6 MOS were not affected by the design differences.

Table C2-4. Summary of MOS Assignments by System.

REFERENCE		BASELINE		
TRACKED	WHEELED	I LANCE	MLIS	LANCE II
SPL:	SPL:	SPL:	SPL:	SPL:
15XX *	15XX *	15XX *	15XX *	15XX *
ASIXX *	ASIXX *	ASIXX *	ASIXX *	ASIXX *
27B *	27B *	27B *	27B *	27B *
31E *	31E *	31E *	31E *	31E *
31S	31S	31S	31S	31S
31V *	31V *	31V	31V	31V
35E *	35E *	35E *	35E *	35E *
35H	35H	35H	35H	35H
52C	52C	52C	52C	52C
54E	54E	54E	54E	54E
63G	63G	63G	63G	63G
63H *	--	63H *	63H *	--
63J	63J	63J	63J	63J
--	63S	--	--	63S
--	63W *	--	--	63W *
63Y	--	63Y	63Y	--

RSV: (Same MOS for each system)

15XX *	31V	63J
ASIXX *	35E	63S
31E *	35H	63W *
31S	52C	

* Course modified to reflect design changes

APPENDIX C3
COURSE MODIFICATION WORKSHEETS

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APPENDIX C3
COURSE MODIFICATION WORKSHEETS

This appendix describes the worksheets that were used to modify existing courses and develop new courses. The appendix is divided into two sections. The first section describes the worksheets used to develop a new operator course while the second section describes the worksheets used to develop new maintenance courses.

The course modification worksheet, which is used to modify or to develop new courses, is divided into three sections. The left-hand section is used to record all of the course modules/elements that are found in the existing course. All of the courses developed for the CSWS study were developed from an existing course. For those parts of an existing course that are not changed, it is not necessary to describe that course in great detail. In such cases, those parts of the existing course are recorded at the annex level. If, however, part of an annex is to be modified, the course elements are recorded at the more detailed level of title or objective. In this way, the pertinent parts of the course

module can be specifically identified and modified in projecting the new course.

The right-hand section of the worksheet contains course information taken from other courses from which additional instruction will be developed. The military branch, course name, and course number are indicated at the beginning of each new instructional module/element.

In the middle section of the worksheet the new course is developed. All of the existing and additional course modules/elements are combined into a projected course which will meet the task, skill, and knowledge requirements of the equipments associated with the new course. This notional course draws upon the left-hand side for existing course information and upon the right-hand side for additional instruction to be taken from other courses. In this manner, it is easy to identify where course elements are being taken from in the development of the new course.

Each of the three sections contains the same course information: (1) the total number of instructional hours required for each module, (2) the instructional hours for each module broken down by type of instruction, and (3) the

student/instructor ratio associated with each type of instruction.

At the end of each course, total academic hours, non-academic hours, and total training time both in hours and man-days, are listed along with a breakdown of the total academic hours by type of instruction for both the existing and projected course.

A column for indicating modification/deletion codes is provided between the existing course and the projected course sections in order to identify the nature and importance of the changes being made in course modules/elements. The modification/deletion codes are as follows:

Course Modification/Deletion Codes

- EL - Subsystem eliminated - major task impact
- NC - No change in subsystem - no task impact
- MIN - Minor subsystem/mission modification - minor task change
- MAJ - Major subsystem/mission modification - major task impact
- ADD - New subsystem added - major task impact.

Major task impacts are those tasks and their associated prerequisite skills and knowledges that are added, deleted, or modified in some substantial way, e.g., modes of operation changed, new technology added, mission procedures altered drastically, etc. Minor task impacts are those tasks and their associated prerequisite skills and knowledges that are not significantly changed, e.g., equipment/ nomenclature changed, mission changed but mission procedures not changed, etc.

The last column on the worksheet is used to record the functional group code that was assigned during the engineering analysis. These numbers provide an easy means of identifying and accounting for new subsystems being added to a course.

In developing a new course, care is taken to project into the new course the course philosophy and instructional strategy found in the existing course. This is done because the existing course is most similar in content and is being taught at the school where the new course would be most likely to be taught. Accordingly, the types of instruction and student/instructor ratios found in courses used for projecting new instruction, are changed to reflect the existing course. These kinds of adjustments are necessary

especially when using Navy courses to project instruction. DRC has noted a tendency for Army training to be performance based to a greater extent than comparable Navy courses.

DRC encountered difficulties in obtaining student/instructor ratios for some courses. In these instances, student/instructor ratios were taken from either TRADOC Cir 351-12 or DA Pam 570-558 and the difficulty was noted on the worksheet.

C3.1 OPERATOR COURSE MODIFICATION WORKSHEETS

A completely new operator course was developed for CSWS: CSWS Crewman (043-15XXX). The new course was projected from the existing Lance Crewman Course (043-15D10). The course developed for the reference system was modified into three new courses to reflect the operator differences in the three baselines. Tables C3-1, C3-2, C3-3, and C3-4 contain the course modification worksheets for each of the four courses.

C3.2 MAINTENANCE COURSE MODIFICATION WORKSHEETS

One maintenance course was developed for CSWS: CSWS Mechanic (ASIXX). The course would lead to an ASI that would be added to the new operator MOS mentioned in the

previous section. The rationale for developing these two courses is found in Section 5.2.2. The new ASI course was developed from the existing ASI course: Lance Missile Mechanic (043-F4). The new course developed for the reference systems was modified into two more courses to reflect design differences in the MLIS and Lance II baselines. Tables C3-5, C3-6, and C3-7 list the course modification worksheets for each of the courses.

Six other courses were modified to reflect various design differences in the reference and/or the baseline systems:

121-27B10	LCSS Test Specialist/Lance Repairer
101-31E20	Field Radio Repair
101-31V10	Tactical Communications Systems Operator/Mechanic
198-35E10	Special Electronic Devices Repairer
611-63H10	Track Vehicle Repairer
610-63W10	Wheel Vehicle Repairer

Tables C3-8 - C3-16 list the course modification worksheets for each of these courses.

All of the new and modified courses and the systems that affected them are shown in Table C3-17. Altogether 16 courses were developed to reflect the design differences in the various systems.

Table C3-1

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE

COURSE Corps Support Missile System MOS 15X2
Crew Member

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION				
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES
Lance Missile Crewman 043-15D10									
D1 Course Introduction WL65L1 Course Introduction to WL65LM Introduction to Operation of the Lance Missile System	.9 1.7	C C	:1 :1	MAJ MAJ	D1 Course Introduction WL65L1 Course Introduction to WL65LM Introduction to Operation of the CSMS	.9 1.7	C C	:1 :1	
Sub Total	2.6				Sub Total	2.6			
D2 Operation and Maintenance Procedures					D2 Operation and Maintenance Procedures				
WL65MA - Introduction to Operation of Lance Vehicles and Identification of Missile Propellants	1.7	C	:1	MAJ	WL65MA Introduction to Operation of CSMS Vehicle,	1.7	C	:1	
WL65MB Prepare the Self- Propelled Launcher (SPL) for Operation	1.7	C		EL	WL65MB Engage/Disengage the suspension lockout system on the SPL	1.7	C	:1	16
WL65MC - Prepare the loader transporter (LT) for operation	5.0	PEL	6:1	NC	WL65MC - Perform resupply boom operations	5.0	PEL	6:1	2001
WL65PL - Introduction to LANCE publications	1.7	C	:1	MIN	WL65PL - Introduction to CSMS publications	1.7 2.5	C PE2	:1 6:1	
WL65PM - Daily preventive maintenance procedures on carrier M667, launch fixture, firing device, mobility kit, monitor programmer, and RI-CAD battery	12.5	PEL	6:1	MAJ	WL65PM - Daily preventive maintenance procedures on the carrier M667 and launch fixture, fire control computer, and RI-CAD battery	12.5	PEL	6:1	See Main- tenance Work- sheet

MIL CW 4

Table -1 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE: Corps Support Squadron, 7th Arm
Crew Member

1987

MOS

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/A RATIO	MODIFICATION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/A RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/A RATIO	GG #
W6510 Perform Daily Preventive maintenance on the RSV and along beam assembly team assembly	8.4	PEI	6:1	NAI	W6510 Perform Daily Preventive maintenance on the RSV and along beam assembly	8.4	PEI	6:1					See Table
W6511 Examination and Critique	8.4	CI	6:1		W6511 Examination and Critique Sub Total	8.4 40.4	CI						
D3 to supply and Transportation operations					D3 to supply and Transportation operations	7.0	PEI	6:1	Harpoon Carrier Team Training J113 0133 (Ravy)	3.0	C	4:1	SPL 26 2601 2602 2603 RSV
W6512 Make Inspect and Load Missile with weather section onto the loader transporter and repackage	10.8	PEI	6:1	NAI	W6512 Package, repackage, inspect and load missile onto ATL and RV								
W6513 Conversion operation	9 7.5	C PEI	4:1 6:1	LI					Harpoon Carrier Handling Operations	4.0	PEI	4:1	20 2301 2601 2602 2603 33 34
W6512 Examination and Critique	9.4	CI	6:1		W6512 Examination and Critique Sub Total	4.0 44.0	CI		Performance and written tests	2.0 1.0	CI CI	4:1 4:1	

MIL CW 4

Table C3-1 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE Support Module System Crew Member MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	FGC
					04 Communication/Electronics	4.2	PE1	6:1		4.2	PE1	6:1	2401 2403 2404 3205
ADD					CE4100 Prepare for operation, operate and perform operator checks and services on Radio Sets AN/VRC 47, AN/VRC-46, and prepare for operation and operate intercommunications. Set AN/VIC-1 and Data Communications Set AN/ASW-25	1.7 8.3	C PE2	1:1 6:1		1.7 8.3	C PE2	1:1 6:1	
ADD					CE4102 - Communication Procedures	1.4 1.3	TV C	1:1 1:1		1.4 1.3	TV C	1:1 1:1	
ADD					CE4104 - Apply anti-jamming procedures and EW remedial measures	2.5 .9	E1 E2	6:1 6:1		1.3 .9	E1 E2	6:1 6:1	

MIL CW

Table C3-1 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE: BASELINE

COURSE Corps Support Missile System Crewmember MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILLS, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILLS AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILLS, AND OBJECTIVES USUALLY PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC
				ADD	CC410A - Prepare for operation speech secure TSEC/KY-5)	.9 1.6	TV PE1	.1 6:1	CC410A - Prepare for operation speech secure TSEC/KY-5)	.9 1.6	TV PE1	.1 6:1	2402
				ADD	CC410B - Operation of speech secure TSEC KY-5)	4.2	PE1	6:1					
				ADD	CC4102 - Examination and Critique Sub Total	4.2 10.2	E-1	6:1	CC4102 - Examination and Critique	4.2	E-1	6:1	
					D.5 Automated Navigation Procedures				Survey Officers Course				1205
				ADD	AS0701 - Introduction to CSMS primary navigation system	.9 .6	C D	.1 20:1	AS0701 - Introduction to Position Azimuth Determination System (PADS)	.9 .8	C D	.1 20:1	
				ADD	AS0702 - Operation of CSMS primary navigation system	0.4	PE1	6:1	AS0702 - Operation of PADS	0.4	PE1	6:1	
				ADD	AS0703 - Introduction to the CSMS secondary navigation system	.9 .8	C D	.1 20:1	AS0703 - Introduction to the Position Azimuth Determination System (PADS)	.9	C	.1	2501 2502 2503
				ADD	AS0704 - Operation of the CSMS secondary navigation system	0.4	PE1	6:1	AS0704 - Operation of PADS	.8	D	20:1	2504 3204

MIL LW-4

Table C3-1 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE Corps Support Missile System Crewmember MOS 15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION, DELETION, OR ADDITION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
D4 Operation of the Monitor Programmer and Firing Device													
WL65NA - Operation of the Monitor Programmer and Firing Device	1.6 16.6	C PE1		ADD	ASOXXX - CSWS Evaluation and Critique Sub Total	.9 6.6 27.7	C E1	1:1 6:1	ASO7NN - PADS Practical Exercise and Review	.9 3.3	C E1	1:1 6:1	
				MAJ	D6 Launch Control Procedures				Harpoon Weapon System Operation				
					WL65NA - Introduction to the CSWS fire control computer	6.0 1.0	C PE1	1:1 6:1	J1113-0131 (NAVY) Introduction to the Harpoon Weapon System (HWS)	6.0 1.0	C PE1	1:1 6:1	3204 3205
					Weapon Control System Procedures	10.0	PE1	6:1	Weapon Control Procedures	10.0	PE1	6:1	
					WL6513 - Comprehensive Examination and Critique	1.0	E1	6:1	Comprehensive Examination and Critique	1.0	E	6:1	
D5 Sighting and Laying Operations				MAJ	Sub Total	20.0							
WL65SL - Sighting and Laying Operations	7.5 24.5	C PE1											
WL6514 - Examination and Critique	8.4	E1											

MIL-OW

Table C3-1 (Con't.)

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINECOURSE: COUSP SUPPBL MISSILE SYSTEM
Crewmember

MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC
D6 Firing Platoon Procedures					D7 Firing Platoon Procedures								System
ML65PA - Position/Replace the Self-Propelled Launcher (SPL)/ Launcher Zero Length (LZL) over the firing point.	2.5 22.5	C PEI	1:1 6:1	HAJ	ML65PA - Position, Replace, Fire, and Displace the SPL.	.5 24.5	C PEI	1:1 6:1					
ML6505 - Examination and Critique	16.8	EL	6:1		ML6505 Examination and Critique	16.8	EL	6:1					
					Sub Total	41.8							N/A
K Tactics, Combined Arms and Doctrine Department	18.0				K Tactics, Combined Arms and Doctrine Department								
TW 45LA - Course Orientation and Security	.9	C	1:1	NC	TW65LA - Course Orientation and Security	.9	C	1:1					
TW65PP Personnel Reliability	.9	C	1:1	NC	TW65PP Personnel Reliability	.9	C	1:1					
TW65SC Security in Combat	.8 1.7	C PEI	1:1 6:1	NC	TW65SC Security in Combat	.8 1.7	C PEI	1:1 6:1					
TW65TT - Terrorist Threat	.9	C	1:1	NC	TW65TT - Terrorist Threat	.9	C	1:1					
TW65RT - Lance Nuclear Section Major Components	.9 1.6	D PEI	20:1 6:1	NC									
TW65SL - Safety, Storage, and Firefighting	.9	D	20:1	NC	TW65SL - Safety, Storage, and Firefighting	.9	D	20:1					

MIL C3

Table C3-1 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE Corps Support Missile System

MOS

15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SI RATIO	MODIFICATION/DELATION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SI RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	SI RATIO	FCG
TM651P - Permissive Action Link	.9	D	20:1	15	TM651P - Permissive Action	.9	D	20:1					N/A
TM650M - Emergency Destruction	.9	D	20:1	15	TM650M - Emergency Destruction	.9	D	20:1					
TM651M - Lance Workhead Section Inspection	1.6	D	6:1	MAJ	TM651M	2.5	PR1	6:1					
TM6501 - Examination and Critique	1.7	E1			TM6501 - Examination and Critique	1.7	E1	6:1					
TM6502 - Examination and Critique	.9	E1			TM6502 - Examination and Critique	.9	E1	1:1					
					Sub Total	11.							
					Academic	21.9	C	1:1					
						99.4	PR1	6:1					
						10.8	PR2	6:1					
						1.1	TV	1:1					
						4.1	D	20:1					
						47.2	E1	6:1					
						.9	E2	6:1					
						.9	E3	6:1					
					Sub Total	186.7							
					Administrative								
					Introductions	24.0							
					Graduation Practice, Graduation	4.0							
					Commanders Time	32.0							
					Sub Total	60.0							
					TOTAL HOURS	246.7							
					TOTAL M.D	10.8							

MIL CV

Table C3-2

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 1

COURSE:

Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SH RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SH RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	SH RATIO	BYC
15XX Reference Course					15XX 1 Lance Course								
D1 Course Introduction					D1 Course Introduction								
WL6511 Course Introduction	.9	C	11	MIN	WL6511 Course Introduction	.9	C	11					
WL651M Introduction to Operation of the CSMS	1.7	C	11	MIN	WL651M Introduction to Operation of the CSMS	1.7	C	11					
					Subtotal	2.6							
D2 Operation and Maintenance Procedures					D2 Operation and Maintenance Procedures								
WL65MA Introduction to Operation of CSMS Vehicles	1.7	C	11	MIN	WL65MA Introduction to Operation of CSMS Vehicles	1.7	C	11					
WL65MB Prepare the Self-Propelled Launcher (SPL) for Operation	1.7	C		MIN	See SPL Drivers Training File, 8's WL65XX								16
WL65MC - Perform Resupply Vehicle Boom Operations	5.0	PR1	611	MIN	WL65MC - Perform Resupply Vehicle Boom Operations	5.0	PR1	611					2001
WL65-PL - Introduction to CSMS Publications	1.7	C	11	MIN	WL65-PL- Introduction to CSMS Publications	1.7	C	11					
WL65PM - Daily Preventive Maintenance Procedures on the Carrier M667, Launch Fixture, Fire Control Computer, and NI-CAD Battery	12.5	PR1	611	MIN	WL65PM - Daily Preventive Maintenance Procedures on the Carrier M667 Launch Fixture, Electronics, and NI-CAD Battery	12.5	PR1	611					See Table
WL65PD - Perform Daily Preventive Maintenance on the RV and Sling Beam Assembly	0.4	PR1	611	MAJ	WL65XX - Daily Preventive Maintenance Procedures on RV Automotive, Missile Support Assembly and Sling Beam Assembly	0.4	PR1	611					See Table

MIL CW 4

Table C3-2 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1.1

COURSE Corps Support Missile System Crewmember MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	MODIFICA TION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRU- TION	S/I RATIO	PCC
WL6511 - Examination and Critique D3 CSMS Resupply and Transportation Operations WL65ME - Package, Repackage, Test/Inspect, and Load Missile onto SPL and RV	8.4	E1	6:1	MIN	WL65XX - Inplace, Displace and Drive the SPL Under Usual and Unusual Conditions	35.0	PE1	6:1					RSV 6:36 14 1804 1805 1808 0606 1805 1808
				MIN	WL65XX - Drive the RSV Under Usual and Unusual Conditions	25.0	PE2						
				MIN	WL6511 - Examination and Critique	8.4 10.0	E1 E2	6:1 6:1					
					Subtotal	111.9							
				MIN	D3 CSMS Resupply and Transportation Operations	7.0	PE1	6:1					SPL 26 2601 2602 2603 RSV 20 2001 2601 2602 2603 33 34
WL6512 - Examination and Critique	4.0	PE1	6:1	MIN	WL6512 - Examination and Critique	4.0 11.0	PE1	6:1					

MIL-CW 4

Table C3-2 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 1

COURSE Corps Support Missile System
Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	FOC
D4 Communication/Electronics CE430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets AN/VRC-47, AN/VRC-46, and Prepare for Operation and Operate Intercommunications. Set AN/VIC-1 and Data Communications Set AN/ASU-25	4.2	PE1	6:1	MIN	D4 Communication/Electronics CE430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets SINGARS IV, PLRS JTIDS, AN/VIC-1, and VANDAL	4.2	PE1	6:1					2401 2403 2404 3205
CE430J - Communication Procedures	1.7 8.3	C PE2	:1 6:1	MIN	CE430J - Communication and Procedures	1.7 8.3	C PE2	:1 6:1					
CE430M - Apply Manual Antijamming Procedures and EN Remedial Measures	.4 1.3	TV C	:1 :1	MIN	CE430M - Apply Manual Antijamming Procedures and EN Remedial Measures	.4 1.3	TV C	:1 :1					
CE430I - Examination and Critique	2.5 .9	E1 E2	6:1 6:1	MIN	CE430I Examination and Critique	2.5 .9	E1 E2	6:1 6:1					

MIL CW 4

Table C3-2 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE: BASELINE 1.1

COURSE Corps Support Missile System Crenmember

MDS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC GC #
CC43VA - Prepare for Operation Speech Secure TSEC/KY-57	.9 1.6	TV PEI	:1 6:1	MIN	CC43VA - Prepare for Operation Speech Secure KYV-4 Vandal	.9 1.6	TV PEI	:1 6:1					2402
CC43VB - Operation of Speech Secure TSEC/KY-57	4.2	PEI	6:1	MIN	CC43VB - Operation of Speech Secure TSEC/KY-57	4.2	PEI	6:1					
CC4302 - Examination and Critique	4.2	EI	6:1	MIN	CC4302 - Examination and Critique	4.2	EI	6:1					
D5 Automated Navigation Procedures					Subtotal	30.2							
ASOXX - Introduction to CSWS Primary Navigation System	.9 .8	C D	:1 20:1	MAJ	D5 Automated Navigation Procedures								3205 2501 2502 2503 2504 3205
ASOXXX - Operation of CSWS Primary Navigation System	8.4	PEI	6:1	MAJ	ASOXXX - Introduction to CSWS Navigation Systems	.9 .3	C D	:1 20:1					
ASOXX - Introduction to the CSWS Secondary Navigation System	.9	C	:1		ASOXXX - Operation of CSWS Navigation Systems for Emplacement and Travel. (The systems are controlled by a common control panel. Software prompts have been added to the software).	10.0	PEI	6:1					
ASOXXX - Operation of the CSWS Secondary Navigation System	.8	D	20:1										

MIL CW-4

Table C3-2 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GR #
ASOXXX - CSWS Navigation Systems Evaluation and Critique	.9	C	:1	MAJ	ASOXXX - CSWS Navigation Systems Evaluation & Critique Subtotal	.9 6.6 18.7	C E1	:1 6:1					
D6Launch Control Procedures					D6Launch Control Procedures				MLRS System Deployment Course				
WL65NA - Introduction to the CSWS Fire Control Computer	6.0 1.0	C P	:1 6:1	MAJ	WL65NA - Introduction to the CSWS Fire Control Computer	1.5 4.5	C PE1	:1 6:1	Annex A.1 Fire Control Operations	58.4			3204 3205
WL65XX - Weapon Control Procedures	10.0	P1	6:1		WL65XX - Weapon Control Procedures	16.9 .5	PE1 C	6:1 :1					
					WLXXX - Manual Elevation and Travers Procedures	1.0	PE1	6:1					
WL6513 - Comprehensive Examination and Critique	3.0	E1	6:1	MAJ	WL6513 - Comprehensive Examination and Critique (Software Prompts have been added to the software). Subtotal	12.0 58.4	E1	6:1					

MIL CW-4

Table 23-2 (Continued)
COURSE MODIFICATION WORKSHEET
REFERENCE: BASELINE 1

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	ST/ RATIO	MODIFICATION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	ST/ RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	ST/ RATIO	PGC
D) Firing Platoon Procedures					D7 CSMS Display Aided Fault Recognition				D7 Patriot Operator Maintenance	2.0	C	.1	
W65FA - Position, Emplace, Fire, and Displace the SPL	.5 24.5	C PEL	.1 6:1		RCXXXX - CSMS Fault Recognition Subtotal	2.0 4.0 6.0	C PEL	.1 6:1	RC5.40206 Fault Recognition	4.0	PEL		1305
W6505 - Examination and Critique	16.8	EL	6:1										
E Tactics, Combined Arms, and Doctrine Department					E Tactics, Combined Arms, and Doctrine Department								
W65LA - Course Orientation and Security	.9	C	.1	NC	W65LA - Course Orientation and Security	.9	C	.1					N/A
W65PP - Personnel Reliability	.9	C	.1	NC	W65PP - Personnel Reliability	.9	C	.1					
W65SC - Security in Combat	.8 1.7	C PEL	.1 6:1	NC	W65SC - Security in Combat	.8 1.7	C PEL	.1 6:1					
W65TT - Terrorist Threat	.9	C	.1	NC	W65TT - Terrorist Threat	.9	C	.1					
W65SL - Safety, Storage, and Firefighting	.9	D	20:1	NC	W65SL - Safety, Storage, and Firefighting	.9	D	20:1					

MIL CW-4

Table C3-2 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 1

COURSE Corps Support Hindle System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/U RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/U RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/U RATIO	PGC
TW65LP - Permissive Action	.9	D	20:1	NC	TW65LP - Permissive Action	.9	D	20:1					N/A
TW65MH - Emergency Destruction	.9 2.5	D PE1	20:1 6:1	NC	TW65MH - Emergency Destruction	.9 2.5	D PE1	20:1 6:1					
TW65JM					TW65JM								
TW6501 - Examination and Critique	1.7	E1	6:1	NC	TW6501 - Examination and Critique	1.7	E1	6:1					
TW6502 - Examination and Critique	.9	E3	1:1	NC	TW6502 - Examination and Critique	.9	E3	1:1					
					Subtotal	13.0							
					Academic	20.0	C	1:1					
						112.0	PE1	6:1					
						68.3	PE2	6:1					
						1.1	TV	1:1					
						3	D	20:1					
						35.4	E1	6:1					
						10.9	E2	6:1					
						.9	E3	6:1					
					Subtotal	251.8							
					Administrative Outprocessing	24.0							
					Graduation Practice/Graduation	4.0							
					Commanders Time	48.0							
					Subtotal	76.0							
					TOTAL	327.8							
					Total M.D	40.9							

MILCWA

Table C3-3

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 2

COURSE Corps Support Missile System Crewmember MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PCC
15XX Reference Course					MLIS								
D1 Course Introduction					D1 Course Introduction								
WL65L1 Course Introduction	.9	C	1:1	MIN	WL65L1 Course Introduction	.9	C	1:1					
WL65LM Introduction to Operation of the CSMS	1.7	C	1:1	MIN	WL65LM Introduction to Operation of the CSMS	1.7	C	1:1					
					Subtotal	2.6							
D2 Operation and Maintenance Procedures					D2 Operation and Maintenance Procedures								
WL65MA Introduction to Operation of CSMS	1.7	C	1:1	MIN	WL65MA Introduction to Operation of CSMS	1.7	C	1:1					
WL65MA Introduction to Operation of CSMS					See SPL Drivers Training File #s WL65XX								16
Engage/Disengage the Suspension Lockout System on the SPL				NC									
WL65MC - Perform Resupply Vehicle Boom Operations	2.2	C	1:1	NC	WL65MC - Perform Resupply Vehicle Boom Operations	5.0	PEI	6:1					
	5.0	PEI	6:1										
WL65PL - Introduction to CSMS Publications	1.7	C	1:1	MIN	WL65PL - Introduction to CSMS Publications	1.7	C	1:1					
	2.5	PEI	6:1			2.5	PEI	6:1					
WL65PM - Daily Preventive Maintenance Procedures on the Carrier M667 Launch Fixture, Electronic System, and NI-CAD Battery	12.5	C	1:1	RL (travelling system)	WL65PM - Daily Preventive Maintenance Procedures on the Carrier M667 Launch Fixture, Electronic System, and NI-CAD Battery	12.5	C	1:1					See Table
		PEI	6:1				PEI	6:1					
WL65PD - Perform Daily Preventive Maintenance on the RSV and Sling Beam Assembly	8.4	PEI	6:1	RL Sling Beam Assy	WL65XX - Daily Preventive Maintenance Procedures on RSV Automotive	8.4	PEI	6:1					See Table

MIL CW 4

Table C-3 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE Corps Support Missile System Classroom MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC
				MIN	WL65XX - Inplace, Displace and Drive the SPL Under Usual and Unusual Conditions	35.0	PE2	6:1					RSV 0606 14 1804 1805 1807
				MIN	WL65XX - Drive the RSV Under Usual and Unusual Conditions	25.0	PE2						0606 1965 1808
WL6511 - Examination and Critique	8.4	E1	6:1	30	WL6511 - Examination and Critique	8.4 10.0 11.0	E1 E2	6:1 6:1					
DJ CSMS Resupply and Transportation Operations					DJ CSMS Resupply and Transportation Operations								
WL65ME - Package, Repackage, Test/Inspect, and Load Missile onto SPL and RV.	7.0	PE1	6:1	EL 6:1:10 Beak Assy	WL65ME - Package, Repackage, Test/Inspect, and Load Missile onto SPL and RV.	6.0	PE1	6:1					SPL 30 RSV 20 2001 26 34
WL6512 - Examination and Critique	4.0	PE1	6:1	VL	WL6512 - Examination and Critique	4.0 --- 10.0	PE1						
					Subtotal								

MILCY

8851

MODIFIED COURSE INFORMATION

COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC
D4 Communication/Electronics CR430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets AN/VRC-47, AN/VRC-46, and Prepare for Operation and Operate Intercommunications. Set AN/VIC-1 and Data Communications Set AN/ASST-25	4.2	PE1	6:1	MIN	D4 Communication/Electronics CR430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets AN/VRC-47, AN/VIC-1, and VANDAL	4.2	PE1	6:1					2401 2403 2404 3205
CR430J - Communication Procedures	1.7 8.3	C PE2	1:1 6:1	MIN	CR430J - Communication and Procedures	1.7 8.3	C PE2	1:1 6:1					
CR430K - Apply Manual Antijamming Procedures and EW Remedial Measures	.4 1.3	TV C	1:1 1:1	MIN	CR430K - Apply Manual Antijamming Procedures and EW Remedial Measures	.4 1.3	TV C	1:1 1:1					
CR430L - Examination and Critique	2.5 .9	E1 E2	7:1 6:1	MIN	CR430L Examination and Critique	2.5 .9	E1 E2	6:1 6:1					

PROB

COURSE MODIFICA: CN WORKSHEET

REFERENCE. BASELINE, 2

15XX

MOS

[illegible]

Table C3-3 (Con't.)

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 1.2

COURSE Corps Surface Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	E/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	E/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	E/I RATIO	OG #
AS0XXX - CSMS Navigation Systems Evaluation and Critique	.9	C	1:1	NAJ	AS0XXX - CSMS Navigation Systems Evaluation & Critique Subtotal	.9 6.6 18.7	C R1	1:1 6:1					
DeLaunch Control Procedures					DeLaunch Control Procedures								
ML65NA - Introduction to the CSMS Fire Control Computer	6.0 1.0	C P1	1:1	NAJ	ML65NA - Introduction to the CSMS Fire Control Computer	1.5 4.5	C P1	1:1 6:1	ML65 System Deployment Course Annex A.1 Fire Control Operations	50.4			J204 J205
ML65XX - Weapon Control Procedures	10.0	P1	6:1	NAJ	ML65XX - Weapon Control Procedures	36.9 .5	P1 C	6:1 1:1					
					ML65XX - Manual Elevation and Traverse Procedures	3.0	P1	6:1					
ML65J - Comprehensive Examination and Critique	3.0	R1	6:1	NAJ	ML65J - Comprehensive Examination and Critique (Software Prompts have been added to the software). Subtotal	12.0 78.4	R1	6:1					

Table C3-3 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 2

15XX

MOS

COURSE (Course Request Mission System Component)

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	E/I RATIO	MODIFICATION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	E/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	E/I RATIO	MOS
D7 Firing Platoon Procedures				ADD	D7 CSBR Display Aided Fault Recognition	2.0 4.0 6.0	C PEI	11 6:1	1st Patriot Missile Crew Member Course	2 4	C PEI		3205
ML650A - Position, Emplace, Fire, and Displace the SPL	.5 24.5	C PEI	11 6:1		MCXXX - CSBR Fault Recognition Subtotal				MC5.40206 Fault Recognition				
ML650S - Examination and Critique	16.8	RI	6:1										N/A
E Tactics, Combined Arms, and Doctrine Department			11		E Tactics, Combined Arms, and Doctrine Department								
TM651A - Course Orientation and Security	.9	C	11	MC	TM651A - Course Orientation and Security	.9	C	11					
TM65PP - Personnel Reliability	.9	C	11	MC	TM65PP - Personnel Reliability	.9	C	11					
TM65AC - Security in Combat	.8 1.7	C PEI	11 6:1	MC	TM65AC - Security in Combat	.8 1.7	C PEI	11 6:1					
TM65TT - Terrorist Threat	.9	C	11	MC	TM65TT - Terrorist Threat	.9	C	11					
TM65SL - Safety, Storage, and Firefighting	.9	D	20:1	MC	TM65SL - Safety, Storage, and Firefighting	.9	D	20:1					

MIL CW 4

Table C3-3 (Con't.)

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE Corps Support Missile System Crewmember

MDS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PCC
TW65LP - Permissive Action	.9	D	20:1	NC	TW65LP - Permissive Action	.9	D	20:1					N/A
TW65MH - Emergency Destruction	.9 2.5	D PE1	20:1 6:1	NC	TW65MH - Emergency Destruction	.9 2.5	D PE1	20:1 6:1					
TW65LM					TW65LM								
TW6501 - Examination and Critique	1.7	E1	6:1	NC	TW6501 - Examination and Critique	1.7	E1	6:1					
TW6502 - Examination and Critique	.9	E3	:1	NC	TW6502 - Examination and Critique	.9	E3	:1					
					Subtotal	13.0							
					Academic	20.0	C	:1					
						110.6	PE1	6:1					
						68.3	PE2	6:1					
						1.3	TV	:1					
						3	D	20:1					
						35.4	E1	6:1					
						10.9	E2	6:1					
						.9	E3	6:1					
					Subtotal	249.9							
					Administrative Outprocessing	24.0							
					Graduation Practice/Graduation	4.0							
					Commanders Time	48.0							
					Subtotal	76.0							
					TOTAL	325.9							
					Total M.D	40.7							

MIL CW-4

Table C3-4

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 3

COURSE Corps Support Missile System Crewmember MOS 15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	FCC
D1 Course Introduction					D1 Course Introduction								
WL65LI Course Introduction	.9	C	:1	MIN	WL65LI Course Introduction	.9	C	:1					
WL65LM Introduction to Operation of the CSWS	1.7	C	:1	MIN	WL65 Introduction to Operation of the CSWS	1.7	C	:1					
					Subtotal	2.6							
D2 Operation and Maintenance Procedures					D2 Operation and Maintenance Procedures								
WL65MA Introduction to Operation of CSWS vehicle	1.7	C	:1	MIN	WL65MA Introduction to Operation of CSWS Vehicles	1.7	C	:1					
Engage/Disengage the suspension lockout system on the SPL	.2	C	:1	NC	See SPL Drivers Training File #1's WL65XX								16
WL65MC - Perform Resupply Boom Operations	5	PEL	6:1	MIN	WL65MC - Perform Resupply Vehicle Boom Operations	5.0	PEL	6:1					2001
WL65PL - Introduction to CSWS Publications	1.7 2.5	C PEL	:1 6:1	MIN	WL65-PL- Introduction to CSWS Publications	1.7 2.5	C PEL	:1 6:1					
WL65PM - Daily Preventive Maintenance Procedures on the Carrier M667, Launch Fixture, Fire Control Computer, and NI-CAD Battery	12.5	PEL	6:1	EL (Traversing System)	WL65PM - Daily Preventive Maintenance Procedures on the HEMTT Engine, Launch Fixture Electronic System and NI-CAD Battery	1.7 12.5	C PEL	:1 6:1					See Table
WL65PD - Perform Daily Preventive Maintenance on the RSV and Sling Beam Assembly				EL									See Table

MIL CW-

COURSE	Corps Support Missile System Crewmember	MOS	15XX

1111 CW-1

Table C3-4 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1.3

COURSE Corps Support Missile System
C3EWMD01

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	FGC
D4 Communication/Electronics CE430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets AN/VRC-47, AN/VRC-46, and Prepare for Operation and Operate Intercommunications. Set AN/VIC-1 and Data Communications Set AN/ASR-25	4.2	PE1	6:1	MIN	D4 Communication/Electronics CE430C - Prepare for Operation, Operate, and Perform Operator Checks and Services on Radio Sets SINGARS V, PLRS JTIDS, AN/VIC-1, and VANDAL	4.2	PE1	6:1					2401 2403 2404 3205
CE430J - Communication Procedures	1.7 8.3	C PE2	:1 6:1	MIN	CE430J - Communication and Procedures	1.7 8.3	C PE2	:1 6:1					
CE430M - Apply Manual Antijamming Procedures and EW Remedial Measures	.4 1.3	TV C	:1 :1	MIN	CE430M - Apply Manual Antijamming Procedures and EW Remedial Measures	.4 1.3	TV C	:1 :1					
CE430I - Examination and Critique	2.5 .9	E1 E2	6:1 6:1	MIN	CE430I Examination and Critique	2.5 .9	E1 E2	6:1 6:1					

MIL CW-4

Table C3-4 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 7.3

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	EOC #
CC43VA - Prepare for Operation Speech Secure TSEC/KY-57	.9 1.6	TV PEI	:1 6:1	MIN	CC43VA - Prepare for Operation Speech Secure KVV-4 Vandal	.9 1.6	TV PEI	:1 6:1					2402
CC43VB - Operation of Speech Secure TSEC/KY-57	4.2	PEI	6:1	MIN	CC43VB - Operation of Speech Secure KVV-4	4.2	PEI	6:1					2402
CC4302 - Examination and Critique	4.2	EI	6:1	MIN	CC4302 - Examination and Critique	4.2	EI	6:1					
D5 Automated Navigation Procedures					Subtotal	30.2							
ASOXX - Introduction to CSWS Primary Navigation System	.9 .8	C D	:1 20:1	MAJ	D5 Automated Navigation Procedures ASOXX - Introduction to CSWS Navigation Systems	.9 .3	C D	:1 20:1					3205 2501 2502 2503 2504 3205
ASOXXX - Operation of CSWS Primary Navigation System	8.4	PEI	6:1	MAJ	ASOXXX - Operation of CSWS Navigation systems for Emplacement and Travel. (The systems are controlled by a common control panel Software prompts have been added to the software).	10.0	PEI	6:1					
ASOXX - Introduction to the CSWS Secondary Navigation System	.9 .8	C D	:1 20:1										
ASOXXX - Operation of the CSWS Secondary Navigation System	8.4	PEI	6:1										

MIL-CW-4

Table C3-4 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 3

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
ASOXXX - CSWS Navigation Systems Evaluation and Critique	.9 6.6	C EI	:1 6:1	MAJ	ASOXXX - CSWS Navigation Systems Evaluation & Critique Subtotal	.9 6.6 18.7	C EI	:1 6:1					
D6Launch Control Procedures					D6Launch Control Procedures								
WL65NA - Introduction to the CSWS Fire Control Computer	6 1	C PI	:1 6:1	MAJ	WL65NA - Introduction to the CSWS Fire Control Computer	1.5 4.5	C PEI	:1 6:1	MLRS System Deployment Course Annex A.1 Fire Control Operations	58.4			3204 3205
WL65XX - Weapon Control Procedures	10	PI	6:1		WL65XX - Weapon Control Procedures	36.9 .5	PEI C	6:1 :1					
					WLXXX -- Manual Elevation and Traverse Procedures	3.0	PEI	6:1					
WL6513 - Comprehensive Examination and Critique	3.0	EI	6:1	MAJ	WL6513 - Comprehensive Examination and Critique (Software Prompts have been added to the software). Subtotal	12.0 58.4	EI	6:1					

Table C3-4 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 3

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	I/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	FG.2
D7 Firing Platoon Procedures				ADD	D7 CSWS Display Aided Fault Recognition								3205
WL65FA - Position, Emplace, Fire, and Displace the SPL	.5 24.5	C PEL	:1 6:1		RCXXX - CSWS Fault Recognition	2.0 4.0 6.0	C PEL	:1 6:1					
WL6505 - Examination and Critique	16.8	E1	6:1		Subtotal								
E Tactics, Combined Arms, and Doctrine Department					E Tactics, Combined Arms, and Doctrine Department								
TW65LA - Course Orientation and Security	.9	C		NC	TW65LA - Course Orientation and Security	.9	C	:1					
TW65PP - Personnel Reliability	.9	C	1	NC	TW65PP - Personnel Reliability	.9	C	:1					
TW65SC - Security in Combat	.8 1.7	C PEL	:1 6:1	NC	TW65SC - Security in Combat	.8 1.7	C PEL	:1 6:1					
TW65TT - Terrorist Threat	.9	C	:1	NC	TW65TT - Terrorist Threat	.9	C	:1					
TW65SL - Safety, Storage, and Firefighting	.9	D	20:1	NC	TW65SL - Safety, Storage, and Firefighting	.9	D	20:1					

Table C3-4 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, 3

COURSE Corps Support Missile System Crewmember

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	PGC
TW65LP - Permissive Action	.9	D	20:1	NC	TW65LP - Permissive Action	.9	D	20:1					N/A
TW65MM - Emergency Destruction	.9	D	20:1	NC	TW65MM - Emergency Destruction	.9	D	20:1					
TW65LM	2.5	PE1	6:1		tion	2.5	PE1	6:1					
TW6501 - Examination and Critique	1.7	E1	6:1	IC	TW65LM								
TW6502 - Examination and Critique	.9	E3	1:1	NC	TW6501 - Examination and Critique	1.7	E1	6:1					
TOTAL ACADEMIC	170.8				TW6502 - Examination and Critique	.9	E3	1:1					
					Subtotal	13.0							
					Academic	18.3	C	1:1					
						43.3	PE1	6:1					
						1.3	PE2	6:1					
						3.0	TV	1:1					
						35.4	D	20:1					
						5.9	E1	6:1					
						.9	E2	6:1					
						.9	E3	6:1					
					Subtotal	204.2							
					Administrative Outprocessing	24.0							
					Graduation Practice/Graduation	4.0							
					Commanders Time	40.0							
					Subtotal	28.0							
					TOTAL	272.2							
					Total M.D	54.0							

MIL CW-4

Table C3-5

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1

COURSE ASIXX MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
From: 043-P4 (AS1 83) Lance Missile Mechanic Annex A WL640A: Course Introduction	.9	C	5:1	MIN	Course Introduction	.9	C	5:1					N/A
WL640B: Introduction to the Multi Gas Detector, and TM 9-1425-485-20	1.7	PEI	5:1	MAJ	Introduction to the CSMS Organizational Maintenance Technical Manual	.8	PEI	5:1					N/A
WL640C: Care and Use of Hand Tools and Tool Kits	1.7	PEI	5:1	MIN	Care and Use of Hand Tools and Tool Kits	1.7	PEI	5:1					N/A
WL640D: Maintenance on Carrier Mounted Equipment (Launch Fixture)	32.0	PEI	5:1	MIN	Organizational Maintenance on the Launch Fixture	12.0	PEI	5:1					30
WL640E: Organizational Maintenance on the Loader-Transporter Handling Unit	32.0	PEI	5:1	MIN	Organizational Maintenance on the RSV Winch and Crane	32.0	PEI	5:1					RSV 20
WL640F: Organizational Maintenance on the Mobility Kit	.9	PEI	5:1	EL									
WL640G: Organizational Maintenance on the Tripod Hoist, Sling Beam, and Firing Device	1.7	PEI	5:1	MAJ	Organizational Maintenance on the Firing Device	.6	PEI	5:1					1204
WL640H: Organizational Maintenance on the Missile Main Assembly and Shipping and Storage Container	.9	PEI	5:1	MIN	Organizational Maintenance on the Missile and Canister	.9	PEI	5:1					33 34

MIL CW 4

Table C3-5 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1

COURSE

ASIXX

MOS

15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
WL6406: Examination and Critique	0.0	E2			Examination and Critique	0.0	E2		From: Navy Course J-113-0127 Harpoon Weapon System (Surface Application) Maintenance	2.0	C	6:1	32
				ADD	CSMS Fire Control System: Introduction to Troubleshooting Fire Control System	1.0 5.0	C PE1	5:1 5:1	Lesson Topic 3.6: Introduction to Fault Isolation	5.0	PE1	3:1	
					Subtotal	6.0			Subtotal	3.0	E1	1:1	
					Data Processor Computer	1.0 2.0	C PE1	5:1 5:1	Lesson Topic 3.8: Data Processor Computer	1.0 1.0	C PE1	6:1 6:1	
					Subtotal	3.0			Subtotal	2.0	E1	6:1	
					Data Conversion Unit				Lesson Topic 3.9 (In Part): Data Conversion Unit	4.0			
					BIT Masks	1.0	C	5:1	BIT Masks	1.0	C	6:1	
					Built-In-Tests	1.0	C	5:1	Built-In-Tests	1.0	C	6:1	
					System Troubleshooting	10.0	PE1	5:1	System Fault Isolation	21.0	PE1	3:1	
					Examination	3.0	E1	3:1	Examination	7.0	E1	1:1	
					Subtotal	15.0			Subtotal	30.0			
					Troubleshooting CSMS Fire Control System	6.0	PE1	5:1	Lesson Topic 3.16: System Fault Isolation	1.0 5.0	C PE1	6:1 3:1	31
					Subtotal CSMS Fire Control System	30.0			Subtotal	6.0			
				ADD	CSMS Launcher Drive System: Launcher Drive System Component Arrangement and Function	3.3 2.5	C PE1	5:1 5:1	From: Navy Course A-113-0044 Gun Mount 5"/54 MK 42 MOD 9 & 10 Lesson Topic 16.1: Gun System Component Arrangement and Function	3.3 2.5	C PE1	12:1 6:1	
					Subtotal	5.8			Subtotal	5.8			

MIL CW 4

Table C3-5 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE: BASELINE 1

COURSE _____ ASIXX _____ MOS _____ 15XX _____

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETE CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
					Launcher Drive System Hydraulic Circuits	2.2	C	5:1	Lesson Topic 16.3: Gun Laying System Hydraulic Circuits	4.1	C	12:1	
					Traverse & Elevation Troubleshooting	6.0	C	5:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
					Subtotal	2.0	PEI	5:1	Subtotal	2.5	PEI	6:1	
					Subtotal	8.0				10.8			
					Traverse & Elevation Operation	10.0	PEI	5:1	Lesson Topic 16.9: Train & Elevation Operation	14.1	PEI	6:1	
Total Academic Time	71.8				Subtotal CSMS Launcher Drive System	26.0							
Administrative Time					Total Academic Time	124.9							
Inprocessing	4.0				Administrative Time								
Outprocessing	4.0				Inprocessing	4.0							
Commandant's Time	.2				Outprocessing	4.0							
Total Nonacademic Time	8.2				Commandant's Time	.2							
Total Course Time	80.0				Total Nonacademic Time	8.2							
Training Time in Man-Days	10.0				Total Course Time	133.1							
Instructional Breakdown					Training Time in Man-Days	16.6							
C .9					Instructional Breakdown								
PEI 70.9					C 16.4								
Total 71.8					PEI 105.5								
					EI 11.0								
					Total 124.9								
Note: 1. Actual student/instructor ratios were not available for 043-P4. Ratios used were taken from either DA Pam 570-558 or TRADOC Cir. 351-12.													

MML:WY

Table C3-6

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 2

COURSE

ASLXX

MOS

15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	QID #
From: 043-P4 (ASI #3) Lance Missile Mechanic Annex A WE640A: Course Introduction	.9	C	5:1	MIN	Course Introduction	.9	C	5:1					N/A
WE640B: Introduction to the Multi Gas Detector, and TM 9-1425-485-20	1.7	PE1	5:1	MAJ	Introduction to the CSMS Organizational Maintenance Technical Manual	.8	PE1	5:1					N/A
WE640C: Care and Use of Hand Tools and Tool Kits	1.7	PE1	5:1	MIN	Care and Use of Hand Tools and Tool Kits	1.7	PE1	5:1					N/A
WE640D: Maintenance on Carried Mounted Equipment (Launch Fixture)	32.0	PE1	5:1	EL									
WE640E: Organizational Maintenance on the Loader-Transporter Handling Unit	32.0	PE1	5:1	MIN	Organizational Maintenance on the RSV Winch and Crane	32.0	PE1	5:1					RSV 20
WE640F: Organizational Maintenance on the Mobility Kit	.9	PE1	5:1	EL									
WE640G: Organizational Maintenance on the Tripod Hoist, Sling Beam, and Firing Device	1.7	PE1	5:1	MAJ	Organizational Maintenance on the Firing Device	.6	PE1	5:1	From: Patriot System Mechanic Course (No Course Number)				3204
WE640H: Organizational Maintenance on the Missile Main Assemblage and Shipping and Storage Container	.9	PE1	5:1	ADD	Organizational Maintenance on the Canister Subtotal	2.0 C C 8.0	C PE1	5:1 5:1	Annex D: RC 4.11508 Perform Maintenance on the Guided Missile (GM) Canister Subtotal	2.0 6.0 8.0	C PE1	20:1 6:1	34

Table C3-6 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE ASIXX MOS 15XX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	QU #
WL6406: Examination and Critique	0.0	E2			Examination and Critique	0.0	E2		From: Navy Course J-113-0127 Harpoon Weapon System (Surface Application) Maintenance				32
				ADD	CSMS Fire Control System: Introduction to Troubleshooting Fire Control System	1.0 5.0	C PE1	5:1 5:1	Lesson Topic 1.6: Introduction to Fault Isolation	2.0 5.0 3.0 10.0	C PE1 E1	6:1 3:1 1:1	
					Subtotal	6.0			Subtotal				
					Data Processor Computer	1.0 2.0	C PE1	5:1 5:1	Lesson Topic 1.8: Data Processor Computer	1.0 1.0 2.0 4.0	C PE1 E1	6:1 6:1 6:1	
					Subtotal	3.0			Subtotal				
					Data Conversion Unit: BIT Masks	1.0	C	5:1	Lesson Topic 3.9 (In Part): Data Conversion Unit	1.0	C	6:1	
					Built-In-Tests	1.0	C	5:1	BIT Masks	1.0	C	6:1	
					System Troubleshooting	10.0	PE1	5:1	Built-In-Tests	21.0	PE1	3:1	
					Examination	3.0	E1	3:1	System Fault Isolation	7.0	E1	1:1	
					Subtotal	15.0			Examination	30.0			
ADD					Troubleshooting CSMS Fire Control System	6.0	PE1	5:1	Lesson Topic 1.16: System Fault Isolation	1.0 5.0 6.0	C PE1	6:1 3:1	31
					Subtotal CSMS Fire Control System	30.0			Subtotal				
					CSMS Launcher Drive System: Control System				From: Navy Course A-113-0044				
NAJ					Launcher Drive System Component Arrangement and Function	1.6 1.1 2.9	C PE1	5:1 5:1	Gun Mount 5"/54 MK 42 MOD 9 & 10	3.3 2.5 5.8	C PE1	12:1 6:1	
					Subtotal				Lesson Topic 16.1: Gun System Component Arrangement and Function				
									Subtotal				

Table C3-6 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE _____ ANIXX _____ MOS 15XX

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	ST/ RATIO	MODIFICATION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	ST/ RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	ST/ RATIO	UD #
				MAJ	Launcher Drive System Hydraulic Circuits	1.1	C	5:1	Lesson Topic 16.3: Gun Laying System Hydraulic Circuits	4.1	C	12:1	
				MAJ	Elevation Troubleshooting	3.0	C	5:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
					Subtotal	1.0	PR1	5:1	Subtotal	2.5	PR1	6:1	
				MAJ	Elevation Operation	4.0				10.8			
Total Academic Time	71.8				Subtotal CWS Launcher Drive System	5.0	PR1	5:1	Lesson Topic 16.9: Train & Elevation Operation	14.1	PR1	6:1	
Administrative Time					Total Academic Time	87.0							
Processing Outprocessing Commandant's Time	4.0				Administrative Time								
.2	4.0				Processing Outprocessing Commandant's Time	4.0							
	.2				Total Nonacademic Time	.2							
... al Nonacademic Time	8.2				Total Course Time	8.2							
Total Course Time	80.0				Training Time in Man-Days	95.2							
Training Time in Man-Days	10.0				Instructional Breakdown	11.9							
Instructional Breakdown													
C .9					C 12.6								
PR1 29.9					PR1 71.4								
					RI 3.0								
Total 71.8					Total 87.0								
Notes: 1. Actual student/instructor ratios were not available for OJ-P4. Ratios used were taken from either DA Form 570-558 or TRAINING Ctr. 311-12.													

Table C3-7

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 3

COURSE

ASIXX

MOS

LSXX

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
From: 043-P4 (ASI 83) Lance Missile Mechanic Annex A													N/A
WL640A: Course Introduction	.9	C	5:1	MIN	Course Introduction	.9	C	5:1					N/A
WL640B: Introduction to the Multi Gas Detector, and TM 9-1425-485-20	1.7	PEI	5:1	MAJ	Introduction to the CSWS Organizational Maintenance Technical Manual	.8	PEI	5:1					N/A
WL640C: Care and Use of Hand Tools and Tool Kits	1.7	PEI	5:1	MIN	Care and Use of Hand Tools and Tool Kits	1.7	PEI	5:1					N/A
WL640D: Maintenance on Carried Mounted Equipment (Launch Fixture)	32.0	PEI	5:1	EL									RSV 20
WL640E: Organizational Maintenance on the Loader-Transporter Handling Unit	32.6	PEI	5:1	MIN	Organizational Maintenance on the RSV Winch and Crane	32.0	PEI	5:1					
WL640F: Organizational Maintenance on the Mobility Kit	.9	PEI	5:1	EL									3204
WL640G: Organizational Maintenance on the Tripod Hoist, Sling Beam, and Firing Device	1.7	PEI	5:1	MAJ	Organizational Maintenance on the Firing Device	.6	PEI	5:1	From: Patriot System Mechanic Course (No Course Number)				
WL640H: Organizational Maintenance on the Missile Main Assemblage and Shipping and Storage Container	.9	PEI	5:1	ADD	Organizational Maintenance on the Missile and Canister Subtotal	2.0 6.9 8.9	C PEI	5:1 5:1	Annex D: RC 4.11508 Perform Maintenance on the Guided Missile (GM) Canister Sub Total	2.0 6.0 8.0	C PEI	20:1 6:1	33 34

REFERENCE, BASELINE 3

15XX

MODIFIED COURSE INFORMATION

Table C3-8

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE 121 27B10

WOS

27B10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PRODUCE ADDED MODULES	NEW	TYPE INSTRUCTION	S/I RATIO	QO #
Annex A: Prerequisite Skills and Knowledge	4.0	C	6:1	NC	Annex A: Prerequisite Skills and Knowledge	4.0	C	6:1					N/A
Subtotal	340.3	SP	3:1		Subtotal	340.3	SP	3:1					
Annex B: Lance Guided Missile System	35.8	C	6:1	NC	Annex B: Lance Guided Missile System	35.8	C	6:1					3001:
	3.2	TV	6:1			3.2	TV	6:1					33
	.5	D	3:1			.5	D	3:1					34
	54.8	PE1	3:1			54.8	PE1	3:1					
	7.0	PE3	6:1			7.0	PE3	6:1					
	11.1	E1	3:1			11.1	E1	3:1					
	3.3	E2	6:1			3.3	E2	6:1					
	.3	E3	6:1			.3	E3	6:1					
Subtotal	116.0				Subtotal	116.0							N/A
Annex C: AN/TSM-93, Operation and Operator Maintenance	199.0	C	6:1	NC	Annex C: AN/TSM-93, Operation and Operator Maintenance	199.0	C	6:1					
	6.9	D	3:1			6.9	D	3:1					
	.4	F	6:1			.4	F	6:1					
	1.6	TV	6:1			1.6	TV	6:1					
	3.0	PI	6:1			3.0	PI	6:1					
	211.9	PE1	3:1			211.9	PE1	3:1					
	32.9	PE3	6:1			32.9	PE3	6:1					
	44.2	E1	3:1			44.2	E1	3:1					
	28.1	E2	6:1			28.1	E2	6:1					
Subtotal	528.0				Subtotal	528.0							N/A
Annex D: Missile Systems Interface	18.0	C	6:1	NC	Annex D: Missile Systems Interface	18.0	C	6:1					
	.8	F	6:1			.8	F	6:1					
	.2	TV	6:1			.2	TV	6:1					
	8.0	CA1	3:1			8.0	CA1	3:1					
	151.4	PE1	3:1			151.4	PE1	3:1					
	6.9	PE3	6:1			6.9	PE3	6:1					
	30.2	E1	3:1			30.2	E1	3:1					
	4.0	E2	6:1			4.0	E2	6:1					
	.2	E3	6:1			.2	E3	6:1					
Subtotal	219.7				Subtotal	219.7							

MIL-OW-4

Table C3-8 (Con't.)

COURSE MODIFICATION WORK SHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

12-27810

NOS

27910

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GO D
					Annex E: CSWS Fire Control System								32
				ADD	Introduction to the CSWS Weapon System	2.0	C	6:1	From: Navy Course 3-113-0177 Harpoon Weapon System (Surface Application) Maintenance Unit 3: Harpoon Weapon System, Gunster Configuration Lesson Topic 3.1: Introduction to the Harpoon Weapon System, Gunster Configuration	2.0	C	6:1	
				ADD	General Description of the CSWS Fire Direction Control System	4.0	C	6:1	Lesson Topic 3.2: System General Description	4.0	C	6:1	
				ADD	System Operation	2.0	C	6:1	Lesson Topic 3.3: System Operation	2.0	C	6:1	
					Subtotal	3.0	PEI	3:1		3.0	PEI	3:1	
						7.0			Subtotal	7.0			
				ADD	System Functional Description	5.0	C	6:1	Lesson Topic 3.4: System Functional Description	11.0	C	6:1	
					Subtotal	6.0	PEI	3:1					
						11.0							
				ADD	Introduction to Fault Isolation	2.0	D	3:1	Lesson Topic 3.6: Introduction to Fault Isolation	2.0	D	6:1	
					Subtotal	5.0	PEI	3:1		5.0	PEI	3:1	
						3.0	EI	3:1		3.0	EI	1:1	
						10.0			Subtotal	10.0			
				ADD	Weapon Control Indicator Panel	3.0	D	3:1	Lesson Topic 3.7: Weapon Control Indicator Panel	3.0	D	6:1	
					Subtotal	1.0	PEI	3:1		1.0	PEI	3:1	
						2.0	EI	3:1		2.0	EI	1:1	
						6.0			Subtotal	6.0			
				ADD	Data Processor Computer	1.0	C	6:1	Lesson Topic 3.8: Data Processor Computer	1.0	C	6:1	
					Subtotal	1.0	PEI	3:1		1.0	PEI	6:1	
						2.0	E2	6:1		2.0	E2	6:1	
						4.0			Subtotal	4.0			

ARLOW-4

Table C3-8 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

121-27810

MOS

27810

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
Total Academic Time Administrative Time: Inprocessing Outprocessing Payday Activities Total Nonacademic Time Total Course Time Training Time in Man-Days	1208.0 16.0 8.0 32.0 56.0 1264.0 158.0			ADD	Data Conversion Unit	13.0	C	6:1	Lesson Topic 3.9: Data Conversion Unit	13.0	C	6:1	N/A
						10.0	D	3:1		10.0	D	6:1	
						27.0	PEL	3:1		27.0	PEL	3:1	
						7.0	EL	3:1		7.0	EL	1:1	
				ADD	Subtotal	57.0			Subtotal	57.0			
					Launcher Switching Unit	2.0	C	6:1	Lesson Topic 3.10: Launcher Switching Unit	4.0	C	6:1	
						2.0	PEL	3:1					
					Subtotal	4.0							
				ADD	Missile Launcher and Launcher Relay Assembly	1.0	C	6:1	Lesson Topic 3.11: Canister Missile Launcher and Launcher Relay Assembly	1.0	C	6:1	
					Remote Firing Panel	1.0	C	6:1	Lesson Topic 3.13: Casualty Panel	1.0	C	6:1	
				ADD	System Fault Isolation	1.0	C	6:1	Lesson Topic 3.16: System Fault Isolation	1.0	C	6:1	
						5.0	PEL	3:1		5.0	PEL	3:1	
					Subtotal	6.0			Subtotal	6.0			
					Examination	7.0	EL	3:1	Examination	7.0	EL	6:1	
				ADD	Subtotal CSWS Fire Control System	120.0			Subtotal Harpoon Fire Control System	120.0			
					Total Academic Time	1328.0							
					Administrative Time:								
					Inprocessing	16.0							
				NC	Outprocessing	8.0							
					Payday Activities	32.0							
					Total Nonacademic Time	56.0							
					Total Course Time	1264.0							
Training Time in Man-Days						158.0							

MILCOW-3

Table C3-8 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

121-27B10

MOS

27B10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Instructional Breakdown:					Instructional Breakdown:								
C	256.8				C	288.8							
D	7.4				D	24.4							
PI	3.0				PI	3.0							
CAI	8.0				CAI	8.0							
F	1.2				F	1.2							
SP	340.3				SP	340.3							
TV	5.0				TV	5.0							
PE1	418.1				PE1	468.1							
PE3	46.8				PE3	46.8							
E1	85.5				E1	104.8							
E2	35.4				E2	37.4							
E3	<u>.5</u>				E3	<u>.5</u>							
TOTAL	1208.0				TOTAL	1328.0							

MILCOW-4

Table C3-9

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE

COURSE

101-11E20

MOS

31E20

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GR #
Annex A: Solid State Power Supply Circuitry	15.6 46.6 3.8 <u>5.0</u> 71.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1	NC	Annex A: Solid State Power Supply Circuitry	15.6 46.6 3.8 <u>5.0</u> 71.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1					N/A
Subtotal					Subtotal								N/A
Annex B: Solid State Audio Amplifier Circuitry	8.9 27.6 .5 <u>4.0</u> 38.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1	NC	Annex B: Solid State Audio Amplifier Circuitry	8.9 24.6 .5 <u>4.0</u> 38.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1					N/A
Subtotal					Subtotal								N/A
Annex C: Operating and Testing Solid State Audio Oscillators	7.8 26.2 4.0 <u>38.0</u>	C PE1 E1	20:1 6:1 6:1	NC	Annex C: Operating and Testing Solid State Oscillators	7.8 26.2 4.0 <u>38.0</u>	C PE1 E1	20:1 6:1 6:1					N/A
Subtotal					Subtotal								N/A
Annex D: Radio Set AN/GRC-160	6.9 17.1 6.2 1.2 141.1 4.5 <u>14.0</u> 191.0	C PI TV F PE1 PE3 E1	20:1 20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex D: Radio Set AN/GRC-160	6.9 17.1 6.2 1.2 141.1 4.5 <u>14.0</u> 191.0	C PI TV F PE1 PE3 E1	20:1 20:1 20:1 20:1 6:1 20:1 6:1					2401 2403
Subtotal					Subtotal								
Annex E: Radio Set AN/VRC-12	2.2 13.2 99.6 <u>13.0</u> 128.0	C PI PE1 E1	20:1 20:1 6:1 6:1	NC	Annex E: Radio Set AN/VRC-12	2.2 13.2 99.6 <u>13.0</u> 128.0	C PI PE1 E1	20:1 20:1 6:1 6:1					
Subtotal					Subtotal								

Table C3-9 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE

101-31E20

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex F: Radio Teletypewriter Set AN/GRC-142	1.5 5.0 55.5 6.0 68.0	C PI PE1 E1	20:1 20:1 6:1 6:1	NC	Annex F: Radio Teletypewriter Set AN/GRC-142	1.5 5.0 55.5 6.0 68.0	C PI PE1 E1	20:1 20:1 6:1 6:1					N/A
Subtotal	68.0				Subtotal	68.0							N/A
Annex G: Radio Set AN/GRC-106 and Radio Teletypewriter Modem MD-522/GRC	10.4 3.0 1.0 243.3 .3 46.0 304.0	C TV PI PE1 PE3 E1	20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex G: Radio Set AN/GRC-106 and Radio Teletypewriter Modem MD-522/GRC	10.4 3.0 1.0 243.3 .3 46.0 304.0	C TV PI PE1 PE3 E1	20:1 20:1 20:1 6:1 20:1 6:1					N/A
Subtotal	304.0				Subtotal	304.0							
Annex H: Maintenance Shop Training Exercise	42.0	PE1	6:1	NC	Annex H: Maintenance Shop Training Exercise	42.0	PE1	6:1					
Annex I: Chemical Agent Automatic Alarm	3.5 .5 1.0 28.5 .5 4.0 38.0	C D TV PE1 PE3 E1	20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex I: Chemical Agent Automatic Alarm	3.5 .5 1.0 28.5 .5 4.0 38.0	C D TV PE1 PE3 E1	20:1 20:1 20:1 6:1 20:1 6:1					23023
Subtotal	38.0				Subtotal	38.0							

Table C3-9 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE 101-31E20

MOS 31E20

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVE	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
					Annex J: PLRS				From: Navy Course C-102-3015 AN/ASM-25 A/B Digital Data Communications System				
				ADD	Introduction to the AN/TSQ-129 Position Location Reporting System (PLRS) and the AN/VSQ-1 Surface Vehicular Unit (SVU)	2.0 2.0	C PI	20:1 20:1	Unit 1: Introduction to the ASW-25 A/B Data Link System	4.0	C	4:1	2404
					Subtotal	4.0							
				ADD	Front-Panel and User Read-Out (URO) Unit	2.0 2.0	C PI	20:1 20:1	Unit 2; Topic 1: AN/ASM-25A/B Control Units (C7100 and C7100A/ASW)	4.0	C	4:1	
					Subtotal	4.0							
				ADD	Troubleshoot Front Panel and User Read-Out (URO) Unit	1.0	PE1	6:1	Unit 3; Topic 5: Operational Checkout of the C7100 and C7100 A	1.0	PE1	2:1	
									From: 102-35L10 Avionic Communications Equipment Repair Course Annex G: Standard Lightweight Avionic Communications Equipment				
					RF Assembly:								
				ADD	Perform Basic Tests on RF Assembly	2.2 4.8	PI PE1	20:1 6:1	G01: Perform Basic Tests on Radio Set AN/ARC-114	2.2 4.8	PI PE1	20:1 6:1	
					Subtotal	7.0			Subtotal	7.0			
				ADD	Isolate Malfunctions in RF Assembly	4.3 .4 20.3	PI TV PE1	20:1 20:1 6:1	G02: Isolate Malfunctions in Radio Set AN/ARC-114	4.3 .4 20.3	PI TV PE1	20:1 20:1 6:1	
					Subtotal	25.0			Subtotal	25.0			

Table C3-9 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE

101-31E20

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
				ADD	Adjust and Align RF Assembly	.6 6.4 7.0	PI PE1	20:1 6:1	GO3: Adjust Radio Set AN/ARC-114	.6 6.4 7.0	PI PE1	20:1 6:1	
				ADD	Examination	2.9 3.0	E1 PI	6:1 20:1	GO4: Examination	2.9 3.0	E1 PI	6:1 20:1	
				ADD	Introduction to the PLRS Portable Test Unit	2.0	C	20:1	From: Navy Course C-102-3015 Unit 3, Topic 1: Introduction to the SM-511 Test Set	2.0	C	4:1	
				ADD	Troubleshoot AN/TSQ-129	7.0	PE1	6:1	Topic 6: AN/ASW-25A/B Troubleshooting	9.0	PE1	2:1	
				ADD	Examination	3.0	E3	20:1	Unit 4: Review and Examination	3.0	E3	2:1	
					PLRS Total	63.0							

MIL-CW

C-104

Table C3-9 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE: BASELINE

COURSE

101-J1E20

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Total Academic Time	918.0				Total Academic Time	981.00							N/A
Administrative Time:				NC	Administrative Time:								
Inprocessing	5.0				Inprocessing	5.0							
Outprocessing	8.0				Outprocessing	8.0							
Physical Conditioning	75.0				Physical Conditioning	75.0							
Commandant's Time	12.0				Commandant's Time	12.0							
Total Nonacademic Time	100.0				Total Nonacademic Time	100.0							
Total Course Time	1018.0				Total Course Time	1081.0							
Training Time In Man-Days	127.3				Training Time In Man-Days	135.1							
101-31E20 POI Man-Days	125.0				Adjusted to 101-31E20 POI Man-Days	135.0							
Instructional Breakdown					Instructional Breakdown								
C	56.8				C	62.8							
D	.5				D	.5							
PI	35.3				PI	46.5							
TV	10.2				TV	10.6							
F	2.2				F	2.2							
PE1	707.4				PE1	746.9							
PE3	9.6				PE3	9.6							
E1	95.0				E1	98.9							
E3					E3	3.0							
Total	918.0				Total	981.0							
Note: 1. Actual student/instructor ratios were not available for either 101-31E20 or 102-35L10. Ratios used were taken from either DA PAN 570-558 or TRADOC Cir 351-12.													

Table C3-10

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

101-11E20

MOS

11E20

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	MODIFICA- TION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRU- TION	S/I RATIO	CG #
Annex A: Solid State Power Supply Circuitry	15.6 46.6 3.8 5.0 71.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1	NC	Annex A: Solid State Power Supply Circuitry/ Subtotal	15.6 46.6 3.8 5.0 71.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1					N/A
Annex B: Solid State Audio Amplifier Circuitry	8.9 24.6 .5 4.0 38.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1	NC	Annex B: Solid State Audio Amplifier Circuitry Subtotal	8.9 24.6 .5 4.0 38.0	C PE1 PE3 E1	20:1 6:1 20:1 6:1					N/A
Annex C: Operating and Testing Solid State Audio Oscillators	7.8 26.2 4.0 38.0	C PE1 E1	20:1 6:1 6:1	NC	Annex C: Operating and Testing Solid State Oscillators Subtotal	7.8 26.2 4.0 38.0	C PE1 E1	20:1 6:1 6:1					N/A
Annex D: Radio Set AN/GRC-160	6.9 17.1 6.2 1.2 141.1 4.5 14.0 191.0	C PI TV F PE1 PE3 E1	20:1 20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex D: Radio Set AN/GRC-160 Subtotal	6.9 17.1 6.2 1.2 141.1 4.5 14.0 191.0	C PI TV F PE1 PE3 E1	20:1 20:1 20:1 20:1 6:1 20:1 6:1					2401 2403
Annex E: Radio Set AN/VRC-12	2.2 13.2 99.6 13.0 128.0	C PI PE1 E1	20:1 20:1 6:1 6:1	NC	Annex E: Radio Set AN/VRC-12 Subtotal	2.2 13.2 99.6 13.0 128.0	C PI PE1 E1	20:1 20:1 6:1 6:1					

MIL-CW 4

Table C3-10 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3.

COURSE 101-31E20

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	QID #
Annex P: Radio Teletypewriter Set AN/GNC-142	1.5 5.0 55.5 6.0 68.0	C P1 PR1 E1	20:1 20:1 6:1 6:1	NC	Annex P: Radio Teletypewriter Set AN/GNC-142	1.5 5.0 55.5 6.0 68.0	C P1 PR1 E1	20:1 20:1 6:1 6:1					N/A
Subtotal					Subtotal								N/A
Annex G: Radio Set AN/GNC-104 and Radio Teletypewriter Modem MD-522/GNC	10.4 1.0 1.0 243.3 .3 46.0 304.0	C TV P1 PR1 PR3 E1	20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex G: Radio Set AN/GNC-104 and Radio Teletypewriter Modem MD-522/GNC	10.4 1.0 1.0 243.3 .3 46.0 304.0	C TV P1 PR1 PR3 E1	20:1 20:1 20:1 6:1 20:1 6:1					N/A
Subtotal					Subtotal								N/A
Annex H: Maintenance Shop Training Exercise	42.0	PR1	6:1	NC	Annex H: Maintenance Shop Training Exercise	42.0	PR1	6:1					
Annex I: Chemical Agent Automatic Alarm	1.5 .5 1.0 28.5 .5 4.0 38.0	C D TV PR1 PR3 E1	20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex I: Chemical Agent Automatic Alarm	1.5 .5 1.0 28.5 .5 4.0 38.0	C D TV PR1 PR3 E1	20:1 20:1 20:1 6:1 20:1 6:1					23023
Subtotal					Subtotal								

Table C3-10 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE 101-31E20 MOS 31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
					Annex J: PLRS				From: Navy Course C-102-3015 AN/ASW-25 A/B Digital Data Communications System				
				ADD	Introduction to the AN/TSQ-129 Position Location Reporting System (PLRS) and the AN/VSQ-1 Surface Vehicular Unit (SVU)	2.0 <u>2.0</u>	C PI	20:1 20:1	Unit 1: Introduction to the AN/ASW-25 A/B Data Link System	4.0	C	4:1	2404
					Subtotal	4.0							
				ADD	Front-Panel and User Read-Out (URO) Unit	2.0 <u>2.0</u>	C PI	20:1 20:1	Unit 2, Topic 1: AN/ASW-25A/B Control Units (C7100 and C7100A/ASW)	4.0	C	4:1	
					Subtotal	4.0							
				ADD	Troubleshoot Front Panel and User Read-Out (URO) Unit	1.0	PEL	6:1	Unit 3, Topic 5: Operational Checkout of the C7100 and C7100 A From: 102-34L10 Avionic Communications Equipment Repair Course Annex G: Standard Lightweight Avionic Communications Equipment	1.0	PEL	2:1	
					RF Assembly:								
				ADD	Perform Basic Tests on RF Assembly	2.2 4.8 <u>7.0</u>	PI PEL	20:1 6:1	G01: Perform Basic Tests on Radio Set AN/ARC-114 Subtotal	2.2 4.8 <u>7.0</u>	PI PEL	20:1 6:1	
					Subtotal								
				ADD	Isolate Malfunctions in RF Assembly	4.3 .4 <u>20.3</u>	PI TV PEL	20:1 20:1 6:1	G02: Isolate Malfunctions in Radio Set AN/ARC-114 Subtotal	4.3 .4 <u>20.3</u> 25.0	PI TV PEL	20:1 20:1 6:1	
					Subtotal	25.0							

MIL CW-4

Table C3-10 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

101-31E20

COURSE

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
				ADD	Adjust and Align RF Assembly Subtotal	.6 <u>6.4</u> 7.0	PI PE1	20:1 6:1	GO3: Adjust Radio Set AN/ARC-114 Subtotal	.6 <u>6.4</u> 7.0	PI PE1	20:1 6:1	
				ADD	Examination Subtotal	2.9 <u>.1</u> 3.0	E1 PI	6:1 20:1	GO4: Examination Subtotal	2.9 <u>.1</u> 3.0	E1 PI	6:1 20:1	
				ADD	Introduction to the PLRS Portable Test Unit	2.0	C	20:1	From: Navy Course C-102-3015 Unit 3, Topic 1: Introduction to the SM-511 Test Set	2.0	C	20:1	
				ADD	Troubleshoot Signal Message Processor Subtotal	13.0 10.0 27.0 <u>7.0</u> 57.0	C PI PE1 E1	20:1 20:1 6:1 6:1	From: Navy Course J-113-0127 Harpoon Weapon System (Surface Application) Maintenance Lesson Topic 3.9: Data Conversion Unit Subtotal	13.0 10.0 27.0 <u>7.0</u> 57.0	C D PE1 E1	6:1 6:1 3:1 1:1	
				ADD	Troubleshoot AN/TSG-129	7.0	PE1	6:1	From: Navy Course C-102-3015 Topic 6: AN/ASW-25A/B Troubleshooting	9.0	PE1	2:1	
				ADD	Examination PLRS Total	3.0 120.0	E3	20:1	Unit 4: Review and Examination	3.0	E3	2:1	

Table C3-10 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

101-31E20

MOS

31E20

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Total Academic Time	918.0			NC	Total Academic Time	1038.0							N/A
Administrative Time:					Administrative Time:								
Inprocessing	5.0				Inprocessing	5.0							
Outprocessing	8.0				Outprocessing	8.0							
Physical Conditioning	75.0				Physical Conditioning	75.0							
Commandant's Time	12.0				Commandant's Time	12.0							
Total Nonacademic Time	100.0				Total Nonacademic Time	100.0							
Total Course Time	1018.0				Total Course Time	1138.0							
Training Time In Man-Days	127.3				Training Time In Man-Days	142.3							
101-31E20 POI Man-Days	125.0				Adjusted to 101-31E20 POI Man-Days	140.0							
Instructional Breakdown					Instructional Breakdown								
C	56.8				C	75.8							
D	.5				D	.5							
PI	35.3				PI	56.5							
TV	10.2				TV	10.6							
F	2.2				F	2.2							
PE1	707.4				PE1	773.9							
PE3	9.6				PE3	9.6							
E1	96.0				E1	105.9							
E3					E3	3.0							
Total	918.0				Total	1038.0							
Note: 1. Actual student/instructor ratios were not available for either 101-31E20 or 102-35L10. Ratios used were taken from either DA PMN 570-558 or TRADOC Cir 351-12.													

MIL CW 4

Table C3-11

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE

COURSE

101-31V10

MOS

31V10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex A: Course Introduction	1.0	PE3	20:1	NC	Annex A: Course Introduction	1.0	PE3	20:1					N/A
Annex B: Common Subjects	3.0	PE3	20:1	NC	Annex B: Common Subjects	3.0	PE3	20:1					N/A
	.5	E2	6:1			.5	E2	6:1					
Subtotal	3.5				Subtotal	3.5							
Annex C: DC Circuits	29.2	PE1	6:1	NC	Annex C: DC Circuits	29.2	PE1	6:1					N/A
	2.3	E1	6:1			2.3	E1	6:1					
Subtotal	31.5				Subtotal	31.5							
Annex D: AC Circuits	43.9	PE1	6:1	NC	Annex D: AC Circuits	43.9	PE1	6:1					N/A
	2.6	E1	6:1			2.6	E1	6:1					
Subtotal	46.5				Subtotal	46.5							
Annex E: Receiver Maintenance	20.4	PE1	6:1	NC	Annex E: Receiver Maintenance	20.4	PE1	6:1					N/A
	4.6	E1	6:1			4.6	E1	6:1					
Subtotal	25.0				Subtotal	25.0							
Annex F: Soldering	8.0	PE1	6:1	NC	Annex F: Soldering	8.0	PE1	6:1					N/A
	2.0	E1	6:1			2.0	E1	6:1					
Subtotal	10.0				Subtotal	10.0							
Annex G: Transmitter Maintenance	23.1	PE1	6:1	NC	Annex G: Transmitter Maintenance	23.1	PE1	6:1					
	4.9	E1	6:1			4.9	E1	6:1					
Subtotal	28.0				Subtotal	28.0							
Annex H: Troubleshoot Medium-Powered FM Radios	47.5	PE1	6:1	NC	Annex H: Troubleshoot Medium-Powered FM Radios	47.5	PE1	6:1					2404
	12.9	PE3	20:1			12.9	PE3	20:1					
	5.6	E1	6:1			5.6	E1	6:1					
Subtotal	66.0				Subtotal	66.0							
				ADD	Subannex H: Radio Set AN/ARC-114	4.4	PE1	6:1	From: 102-35K10 Avionic Mechanic Course File AC9: SLAE Communications Equipment	2.6	C	15:1	
					Subtotal	.6	PE3	20:1		1.2	D	15:1	2404
						5.0				14.2	PE1	6:1	
									Subtotal	18.0			

MIL-CW-4

Table C3-11 (Con't.)

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE

COURSE 101-31V10 MOS 31V10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	MODIFICA TION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRU- TION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRU- TION	S/I RATIO	GG #
Annex I: Troubleshoot Low-Powered FM Radio	24.8 5.2 <u>3.5</u>	PE1 PE3 E1	6:1 20:1 6:1	NC	Annex I: Troubleshoot Low-Powered FM Radio	24.8 5.2 <u>3.5</u>	PE1 PE3 E1	6:1 20:1 6:1					N/A
Subtotal	33.5				Subtotal	33.5							2402
Annex J: Troubleshoot Secured FM Radio Electronic Warfare	23.5 7.5 <u>6.0</u>	PE1 PE3 E1	6:1 20:1 6:1	NC	Annex J: Troubleshoot Secured FM Radio Electronic Warfare	23.0 7.5 <u>6.0</u>	PE1 PE3 E1	6:1 20:1 6:1					
Subtotal	36.5				Subtotal	36.5							2403
Annex K: Troubleshoot Intercommunications System Application and Installation of AN/VIC-1	32.8 7.7 <u>3.5</u>	PE1 PE3 E1	6:1 20:1 6:1	NC	Annex K: Troubleshoot Intercommunications System Application and Installation of AN/VIC-1	32.8 7.7 <u>3.5</u>	PE1 PE3 E1	6:1 20:1 6:1					N/A
Subtotal	44.0				Subtotal	44.0							
Annex L: Troubleshoot Single Sideband Radio Teletype-writer Sets	33.8 6.7 <u>4.0</u>	PE1 PE3 E1	6:1 20:1 6:1	NC	Annex L: Troubleshoot Single Sideband Radio Teletype-writer Sets	33.8 6.7 <u>4.0</u>	PE1 PE3 E1	6:1 20:1 6:1					
Subtotal	44.5				Subtotal	44.5							
Total Academic Time	370.0				Total Academic Time	375.0							
Administrative Time:					Administrative Time:								
Inprocessing	8.0				Inprocessing	8.0							
Outprocessing	6.0				Outprocessing	6.0							
Physical Conditioning	20.0				Physical Conditioning	20.0							
Commandant's Time	<u>12.0</u>				Commandant's Time	<u>12.0</u>							
Total Nonacademic Time	46.0				Total Nonacademic Time	46.0							
Total Course Time	416.0				Total Course Time	421.0							
Training Time in Man-Days	52.0				Training Time in Man-Days	52.6							

MIL-CW 4

Table C3-11 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE 101-31V10

MOS 31V10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Instructional Breakdown PE1 286.5 PE3 44.0 E1 39.0 E2 1.5 Total 370.0					Instructional Breakdown PE1 290.9 PE3 44.6 E1 39.0 E2 1.5 Total 375.0								
Note: 1. Actual student/instructor ratios were not available for either 101-31V10 or 102-35K10. Ratios used were taken from either DA PAM 570-558 or TRADOC Cir 351-12.													

Table C3-12

COURSE MODIFICATION WORKSHEET

REFERENCE: BASELINE 1.4.2.3

COURSE

198 - 35E10

MOS

35E10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex A: Fundamental Subjects and Basic Electricity Subtotal	27.2	C	20:1	NC	Annex A: Fundamental Subjects and Basic Electricity Subtotal	27.2	C	20:1				20:1	N/A
	5.5	PI	20:1			5.5	PI	20:1					
	.6	D	20:1			.6	D	20:1					
	1.1	F	20:1			1.1	F	20:1					
	26.6	PE1	6:1			26.6	PE1	6:1					
	20.0	PE3	20:1			20.0	PE3	20:1					
	4.0	E2	6:1			4.0	E2	6:1					
85.0					85.0								
Annex B: Fundamentals of Alternating Current Subtotal	18.4	C	20:1	NC	Annex B: Fundamentals of Alternating Current Subtotal	18.4	C	20:1				20:1	N/A
	10.7	PI	20:1			10.7	PI	20:1					
	2.0	D	20:1			2.0	D	20:1					
	1.2	F	20:1			1.2	F	20:1					
	.7	TV	20:1			.7	TV	20:1					
	25.0	PE1	6:1			25.0	PE1	6:1					
	1.0	PE2	6:1			1.0	PE2	6:1					
4.0	PE3	20:1	4.0	PE3	20:1								
8.0	E2	6:1	8.0	E2	6:1								
71.0					71.0								
Annex C: Solid State Technology Subtotal	25.5	C	20:1	NC	Annex C: Solid State Technology Subtotal	25.5	C	20:1				20:1	N/A
	3.0	PI	20:1			3.0	PI	20:1					
	.5	F	20:1			.5	F	20:1					
	2.0	TV	20:1			2.0	TV	20:1					
	36.0	PE1	6:1			36.0	PE1	6:1					
	67.0					67.0							
Annex D: Mine Detectors Subtotal	11.1	C	20:1	NC	Annex D: Mine Detectors Subtotal	11.1	C	20:1				20:1	N/A
	1.0	D	20:1			1.0	D	20:1					
	.4	F	20:1			.4	F	20:1					
	13.5	PE1	6:1			13.5	PE1	6:1					
	5.0	E1	6:1			5.0	E1	6:1					
	31.0					31.0							

MIL CV 4

Table C3-12 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE BASELINE 1, 2, 3

COURSE

198-35E10

MOS

35E10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex E: Night Vision Equipment	12.5 5.5 1.5 19.5 3.0 4.0 <u>46.0</u>	C D TV PE1 PE3 E2	20:1 20:1 20:1 6:1 20:1 6:1	NC	Annex E: Night Vision Equipment	12.5 5.5 1.5 19.5 3.0 4.0 <u>46.0</u>	C D TV PE1 PE3 E2	20:1 20:1 20:1 6:1 20:1 6:1					N/A
Subtotal	46.0				Subtotal	46.0							
Annex F: Battlefield Illumination	13.0 7.0 26.0 10.0 <u>56.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1	NC	Annex F: Battlefield Illumination	13.0 7.0 26.0 10.0 <u>56.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1					N/A
Subtotal	56.0				Subtotal	56.0							
Annex G: Advanced Electronic Instrumentation	4.0 3.0 8.0 5.0 <u>20.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1	NC	Annex G: Advanced Electronic Instrumentation	4.0 3.0 8.0 5.0 <u>20.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1					N/A
Subtotal	20.0				Subtotal	20.0							
Annex H: Distance Measuring Equipment	30.0 4.0 56.0 5.0 <u>95.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1	NC	Annex H: Distance Measuring Equipment	30.0 4.0 56.0 5.0 <u>95.0</u>	C D PE1 E2	20:1 20:1 6:1 6:1					N/A
Subtotal	95.0				Subtotal	95.0							
Annex I: Azimuth Orientation Equipment	8.5 4.0 .5 24.0 3.0 <u>40.0</u>	C D PI PE1 E2	20:1 20:1 20:1 6:1 6:1	NC	Annex I: Azimuth Orientation Equipment	8.5 4.0 .5 24.0 3.0 <u>40.0</u>	C D PI PE1 E2	20:1 20:1 20:1 6:1 6:1					N/A
Subtotal	40.0				Subtotal	40.0							

Table C3-12 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1, 2, 3

COURSE

198 35110

MOS

35E10

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex J: PADS	31.5 16.5 5.0 53.0	C PE1 E2	20:1 6:1 6:1	NC	Annex J: PADS Subtotal	31.5 16.5 5.0 53.0	C PE1 E2	2:1 6:1 6:1	From: 102-35M10 Avionic Navigation and Flight Control Equipment Repair Annex J: Stability Augmentation Systems (SAS)				25
				ADD	Annex K: AHRS Localize Troubles in CV 2858/ASN 107 Converter Subtotal	.9 .4 2.3 4.0	C D PE1 TV	20:1 20:1 6:1 20:1	File J10: Localize Troubles in AH-1G SAS Amplifier Subtotal	.9 .4 2.3 4.0	C D PE1 TV	12:1 12:1 6:1 12:1	2502
					Isolate Troubles in CV 2858/ASN 107 Converter Subtotal	3.1 1.7 17.2 22.0	C D PE1	20:1 20:1 6:1	File J11: Isolate Troubles in AH-1G SAS Amplifier Subtotal	3.1 1.7 17.2 22.0	C D PE1	12:1 12:1 6:1	
					Troubleshoot CN 1366/ASN 107 Displacement Gyro Subtotal	5.4 .9 23.7 30.0	C D PE1	20:1 20:1 6:1	Annex K: Gyromagnetic Compass Systems File K01: Troubleshoot Directional Gyro CN-998/ASN Subtotal	5.4 .9 23.7 30.0	C D PE1	12:1 17:1 11	
					Examination Subtotal AHRS	4.0 63.0	E2	6:1	File K02: Examination	4.0	E1	6:1	
End of Course Examination	13.0	E2	6:1		End of Course Examination	13.0	E2	6:1					
Total Academic Time	577.0				Total Academic Time	637.0							

MIL CW 4

Table C3-12 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE BASELINE 1.2.2.3

COURSE

198-35E10

MOS

35E10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
Administrative Time Inprocessing Outprocessing Physical Training Commandant's Time Open Time Total Nonacademic Time Total Course Time Training Time in Man-Days Instructional Breakdown C 186.7 D 25.6 PE1 243.3 PE3 27.0 PI 23.0 F 3.2 TV 4.2 E1 4.0 E2 60.0 Total 577.0	24.0 8.0 54.0 45.0 13.0 144.0 722.0 90.0 <												

NOTE: 1. Actual student/instructor ratios were not available for either 198-35E10 or 102-35M10. Ratios used were taken from either DA Pam 570-558 or TRADOC Ctr 351-12.

Table C3-13

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1

COURSE 611-6 JH10

MOS 61H10

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
Annex A: Course/Soldier's Manual Orientation	1.0	C	52:1	NC	Annex A: Course/Soldier's Manual Orientation	1.0	C	52:1					N/A
	1.0	PM	20:1			1.0	PM	20:1					
Subtotal	2.0				Subtotal	2.0							
Annex B: Basic Maintenance Skills and Knowledge	34.9	C	52:1	NC	Annex B: Basic Maintenance Skills and Knowledge	34.9	C	52:1					N/A
	4.5	D	20:1			4.5	D	20:1					
	6.1	TV	52:1			6.1	TV	52:1					
	8.0	PE1	6:1			8.0	PE1	6:1					
	3.0	PE1	52:1			3.0	PE1	52:1					
	3.5	E3	52:1			3.5	E3	52:1					
Subtotal	60.0				Subtotal	60.0							
Annex C: M60A1 Tank Maintenance	5	TV	52:1	NC	Annex C: M60A1 Tank Maintenance	5	TV	52:1					N/A
	42.5	PE1	6:1			42.5	PE1	6:1					
	4.0	E1	4:1			4.0	E1	4:1					
Subtotal	47.0				Subtotal	47.0							
Annex D: M110 Self-Propelled Artillery Maintenance	9.0	PE1	6:1	NC	Annex D: M110 Self-Propelled Artillery Maintenance	9.0	PE1	6:1					N/A
	1.0	E1	6:1			1.0	E1	6:1					
Subtotal	10.0				Subtotal	10.0							
Annex E: M113A1 Armored Personnel Carrier (APC) Maintenance	4	TV	52:1	NC	Annex E: M113A1 Armored Personnel Carrier (APC) Maintenance	4	TV	52:1					N/A
	14.0	PE1	6:1			14.0	PE1	6:1					
	27.6	PE1	4:1			27.6	PE1	4:1					
	3.0	E1	4:1			3.0	E1	4:1					
Subtotal	45.0				Subtotal	45.0							
Annex F: Troubleshooting Fuel and Electrical Systems	13.0	PE1	4:1	NC	Annex F: Troubleshooting Fuel and Electrical Systems	13.0	PE1	4:1					N/A
	1.0	E1	6:1			1.0	E1	6:1					
Subtotal	14.0				Subtotal	14.0							
					From: Navy Course A-113-0044								
					Gun Mount 5"/54 MK42								
					MOD 9 + 10								
					Lesson Topic 16.1: Gun System Component	3.3	C	52:1		3.3	C	52:1	31
					Arrangement and Function	2.5	PE1	6:1		2.5	PE1	6:1	
					Subtotal	5.8				Subtotal			

MIL CW 4

Table C3-13 (Con't.)

COURSE MODIFICATION WORKSHEET

1. REFERENCE, BASELINE 1

COURSE 611-63H10

MOS

6JH10

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
				ADD	Launch System Electrical Control Circuits	4.4	C	52:1	Lesson Topic 16.2: Gun Laying System Electrical Control Circuits	4.4	C	12:1	
				ADD	Launch System Hydraulic Circuits	4.1	C	52:1	Lesson Topic 16.3: Gun Laying System Hydraulic Circuits	4.1	C	12:1	
				ADD	Traverse & Elevation & Electronics Servos Control Unit	1.7	C	52:1	Lesson Topic 16.4 Train & Elevation & Electronic Servos Control Unit	1.7	C	12:1	
				ADD	Traverse & Elevation Synchro Control Circuits	8.3 1.7 10.0	C PEI	52:1 6:1	Lesson Topic 16.5: Train & Elevation Synchro Control Circuits	8.3 1.7 10.0	C PEI	12:1 6:1	
				ADD	Traverse & Elevation Servo Amplifier	8.3 2.5 10.8	C PEI	52:1 6:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3 2.5 10.8	C PEI	12:1 6:1	
				ADD	Traverse & Elevation Fault Isolation	8.3 2.5 10.8	C PEI	52:1 6:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3 2.5 10.8	C PEI	12:1 6:1	
				ADD	Traverse & Elevation Planned Maintenance	5.8	PEI	6:1	Lesson Topic 16.8: Train & Elevation Planned Maintenance	5.8	PEI	6:1	
				ADD	Traverse & Elevation Operation	14.1	PEI	6:1	Lesson Topic 16.9: Train & Elevation Operation	14.1	PEI	6:1	
				ADD	Examination	9.1 2.5 79.1	E1 E3	6:1 52:1	Performance Test Written Test	9.1 2.5	E1 E3	1:1 12:1	
					Subtotal CSWS Launch System	79.1			Subtotal MK42 Gun Laying	79.1			

MIL CW 4

Table C3-13 (Con't.)

COURSE MODIFICATION WORKSHEET

F. REFERENCE.. BASELINE 1

COURSE

611-6 M10

MOS

63110

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG //
Annex G: Basic Recovery Skills and Knowledge Training	9.0 1.5 1.0 9.0 1.5 1.0 Subtotal	PM QC TV PE1 PE3 E3	20:1 20:1 52:1 6:1 20:1 52:1	NC	Annex H: Basic Recovery Skills and Knowledge Training	9.0 1.5 1.0 9.0 1.5 1.0 Subtotal	PM QC TV PE1 PE3 E3	20:1 20:1 52:1 6:1 20:1 52:1					N/A
Annex H: MBRA1 Recovery Vehicle Operation and Maintenance (Operator/Crew)	5.0 1.0 15.0 Subtotal	PM QC WC1	20:1 20:1 2:1	NC	Annex I: MBRA1 Recovery Vehicle Operation and Maintenance (Operator/Crew)	5.0 1.0 15.0 Subtotal	PM QC WC1	20:1 20:1 2:1					N/A
Annex I: Field Recovery Operations	4.5 .5 11.0 Subtotal	PM TV WC1	20:1 52:1 1:1	NC	Annex J: Field Recovery Operations	4.5 .5 11.0 Subtotal	PM TV WC1	20:1 52:1 2:1					N/A
Annex J: Maintenance Refresher Trainer	15.0	PE1	6:1	NC	Annex K: Maintenance Refresher Trainer	15.0	PE1	6:1					N/A
Annex K: End-of-Course Examination	16.0	PE1	4:1	NC	Annex L: End-of-Course Examination	16.0	PE1	4:1					N/A
Total Classroom Time	271.0				Total Classroom Time	350.1							
Common Military Education and Training (CMET)	50.0			NC	Common Military Education and Training (CMET)	50.0							N/A
Total Academic Time	321.0				Total Academic Time	400.1							

MIL CW 4

Table C3-13 (Con't.)

COURSE MODIFICATION WORKSHEET

T. REFERENCE, BASELINE 1

COURSE

611-6.1110

MOS

6.1110

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SI RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES AND OBJECTIVES	HOURS	TYPE INSTRUCTION	SI RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	SI RATIO	QU ID
Administrative Time				NC	Administrative Time								N/A
Input/Processing	8.0				Input/Processing	8.0							
Output/Processing	8.0				Output/Processing	8.0							
Commander's Time	11.0				Commander's Time	11.0							
Open Time	24.0				Open Time	24.0							
Total Nonacademic Time	71.0				Total Nonacademic Time	71.0							
Total Course Time	192.0				Total Course Time	471.1							
Training Time in Man-Days	49.0				Training Time in Man-Days	58.9							
Instructional Breakdown					Instructional Breakdown								
C 35.9					C 74.1								
D 4.5				D 4.5									
PM 19.5				PM 19.5									
TV 8.5				TV 8.5									
QC 2.5				QC 2.5									
PE1 154.1				PE1 103.2									
PE1 6.5				PE1 6.5									
E1 9.0				E1 18.1									
E1 4.5				E1 7.0									
WC1 29.9				WC1 46.0									
Total 271.0				Total 150.1									

M11 CW4

Table C3-14

COURSE MODIFICATION WORKSHEET

W. REFERENCE, BASELINE

COURSE

610-63410

MOS

63410

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/R RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/R RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/R RATIO	GG #
Annex A: Orientation Subtotal	2.6 1.4 4.0	C PE3	24:1 20:1	NC	Annex A: Orientation Subtotal	2.6 1.4 4.0	C PE3	24:1 20:1					N/A
Annex B: Basic Maintenance Skills/Knowledges Subtotal	33.0 3.6 5.9 10.5 5.2 59.0	C TV D PE1 PE3 F	24:1 24:1 20:1 6:1 20:1 24:1	NC	Annex B: Basic Maintenance Skills/Knowledges Subtotal	33.2 3.6 5.9 10.5 5.3 59.0	C TV D PE1 F F	24:1 24:1 20:1 6:1 20:1 24:1					N/A
Annex C: 1-1/4 Ton Vehicle Maintenance Subtotal	.7 .5 24.4 .4 6.0 32.0	PM TV PE1 PE3 E1	20:1 24:1 6:1 20:1 4:1	NC	Annex C: 1-1/4 Ton Vehicle Maintenance Subtotal	.7 .5 24.4 .4 6.0 32.0	PM TV PE1 PE3 E1	20:1 24:1 6:1 20:1 4:1					N/A
Annex D: 14 Ton Vehicle Maintenance Subtotal	6.0 .5 3.0 9.5	PE1 PE3 E1	6:1 20:1 4:1	NC	Annex D: 14 Ton Vehicle Maintenance Subtotal	6.0 .5 3.0 9.5	PE1 PE3 E1	6:1 20:1 4:1					N/A
Annex E: 5 Ton Vehicle Maintenance Subtotal	1.0 22.5 1.5 7.0 32.0	PM PE1 PE2 E1	20:1 6:1 6:1 4:1	NC	Annex E: 5 Ton Vehicle Maintenance Subtotal	1.0 22.5 1.5 7.0 32.0	PM PE1 PE2 E1	20:1 6:1 6:1 4:1					N/A
Annex F: 2-1/2 Ton Vehicle Maintenance Subtotal	.7 .5 16.7 .1 6.0 24.0	PM TV PE1 PE3 E1	20:1 24:1 4:1 20:1 4:1	NC	Annex F: 2-1/2 Ton Vehicle Maintenance Subtotal	.7 .5 16.7 .1 6.0 24.0	PM TV PE1 PE3 E1	20:1 24:1 4:1 20:1 4:1					N/A

MIL CW-4

Table C3-14 (Con't.)
COURSE MODIFICATION WORKSHEET

W. REFERENCE, BASELINE

COURSE 610-63W10 MOS 63W10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
Annex G: 1/4 Ton Vehicle Maintenance	.9	PM	20:1	NC	Annex G: 1/4 Ton Vehicle Maintenance	.9	PM	20:1					N/A
	.6	TV	24:1										
	22.5	PE1	6:1										
	8.0	PE1	4:1										
Subtotal	32.0				Subtotal	32.0							
Annex H: Troubleshooting	3.0	PM	20:1	NC	Annex H: Troubleshooting	3.0	PM	20:1					
	3.0	ST	20:1										
	6.0	SI	6:1										
	1.0	QC	20:1										
	14.0	PE1	6:1										
	1.0	PE2	6:1										
	3.0	E1	4:1										
Subtotal	31.0				Subtotal	31.0							
				ADD	Annex I: CSMS Maintenance Launch System Component Arrangement and Function	3.3	C	24:1	Lesson Topic 16.1: Gun System Component Arrangement and Function	3.3	C	12:1	31
						2.5	PE1	6:1		2.5	PE1	6:1	
						5.8		5.8					
						4.4	C	24:1		4.4	C	12:1	
						4.1	C	24:1		4.1	C	12:1	
						1.7	C	24:1		1.7	C	12:1	
				ADD	Traverse & Elevation & Electronic Servos Control Unit	8.3	C	24:1	Lesson Topic 16.4: Train & Elevation & Electronics Servos Control Unit	8.3	C	12:1	
						1.7	PE1	6:1		1.7	PE1	6:1	
						10.0		10.0					
						Subtotal		Subtotal					

MIL CW-4

Table C3-14 (Con't.)
COURSE MODIFICATION WORKSHEET

W. REFERENCE, BASELINE

COURSE

610-6 JW10

MOS

6JW10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex I: Basic Recovery Skills/Knowledges	12.0	PM	20:1	NC	Traverse & Elevation Servo Amplifier	8.3	C	24:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3	C	12:1	N/A
	1.2	TV	24:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	2.0	QC	20:1		Traverse & Elevation Fault Isolation	8.3	C	24:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
	3.2	PE1	4:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	2.0	PE2	6:1		Traverse & Elevation Planned Maintenance	10.8	PE1	6:1	Lesson Topic 16.8: Train & Elevation Planned Maintenance	10.8	PE1	6:1	
	6.6	PE3	20:1		Traverse & Elevation Operation	5.8	PE1	6:1	Lesson Topic 16.9: Train & Elevation Operation	5.8	PE1	6:1	
	27.0				Examination	14.1	PE1	6:1	Performance Test	14.1	PE1	6:1	
					Subtotal CSWS Launch System	9.1	E1	4:1	Written Test	9.1	E1	1:1	
					Annex J: Basic Recovery Skill/Knowledges	2.5	E3	24:1	Subtotal MK42 Gun Laying	2.5	E3	12:1	
					Subtotal	79.1				79.1			
Annex J: 5 Ton Wrecker Operation	13.0	PM	20:1	NC	Traverse & Elevation Servo Amplifier	8.3	C	24:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3	C	12:1	N/A
	1.0	TV	24:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	1.0	QC	20:1		Traverse & Elevation Fault Isolation	8.3	C	24:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
	.5	F	24:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	17.0	PE1	2:1		Traverse & Elevation Planned Maintenance	10.8	PE1	6:1	Lesson Topic 16.8: Train & Elevation Planned Maintenance	10.8	PE1	6:1	
	1.0	PE2	6:1		Traverse & Elevation Operation	5.8	PE1	6:1	Lesson Topic 16.9: Train & Elevation Operation	5.8	PE1	6:1	
	4.5	PE3	20:1		Examination	14.1	PE1	6:1	Performance Test	14.1	PE1	6:1	
	2.0	E1	2:1		Subtotal CSWS Launch System	9.1	E1	4:1	Written Test	9.1	E1	1:1	
	2.0	E1	2:1		Annex J: Basic Recovery Skill/Knowledges	2.5	E3	24:1	Subtotal MK42 Gun Laying	2.5	E3	12:1	
					Subtotal	79.1				79.1			
Annex J: 5 Ton Wrecker Operation	13.0	PM	20:1	NC	Traverse & Elevation Servo Amplifier	8.3	C	24:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3	C	12:1	N/A
	1.0	TV	24:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	1.0	QC	20:1		Traverse & Elevation Fault Isolation	8.3	C	24:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
	.5	F	24:1		Subtotal	2.5	PE1	6:1	Subtotal	2.5	PE1	6:1	
	17.0	PE1	2:1		Traverse & Elevation Planned Maintenance	10.8	PE1	6:1	Lesson Topic 16.8: Train & Elevation Planned Maintenance	10.8	PE1	6:1	
	1.0	PE2	6:1		Traverse & Elevation Operation	5.8	PE1	6:1	Lesson Topic 16.9: Train & Elevation Operation	5.8	PE1	6:1	
	4.5	PE3	20:1		Examination	14.1	PE1	6:1	Performance Test	14.1	PE1	6:1	
	2.0	E1	2:1		Subtotal CSWS Launch System	9.1	E1	4:1	Written Test	9.1	E1	1:1	
	2.0	E1	2:1		Annex J: Basic Recovery Skill/Knowledges	2.5	E3	24:1	Subtotal MK42 Gun Laying	2.5	E3	12:1	
					Subtotal	79.1				79.1			

MIL-OW-4

Table C3-14 (Con't.)
COURSE MODIFICATION WORKSHEET

W REFERENCE, BASELINE

COURSE

610-63410

MOS

63410

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CG #
Annex K: Heavy Equipment Transporter (HET) Operation	11.5 13.0 -5 3.0 2.0 30.0	PM PE1 PE2 PE3 E1	20:1 2:1 6:1 20:1 2:1	NC	Annex L: Heavy Equipment Transporter (HET) Operation	11.5 13.0 -5 3.0 2.0 30.0	PM PE1 PE2 PE3 E1	20:1 2:1 6:1 20:1 2:1					N/A
Subtotal	30.0				Subtotal	30.0							
Annex L: Maintenance Review	1.7 .8 24.0 3.0 1.0 30.5	PM TV PE1 PE1 PE2	20:1 24:1 6:1 4:1 6:1	NC	Annex M: Maintenance Review	1.7 .8 24.0 3.0 1.0 30.5	PM TV PE1 PE1 PE2	20:1 24:1 6:1 4:1 6:1					N/A
Subtotal	30.5				Subtotal	30.5							
Annex M: End of Course Examination	25.0	E1	4:1	NC	Annex N: End of Course Examination	25.0	E1	4:1					N/A
Total Classroom Time	376.0				Total Classroom Time	455.1							
Annex N: Common Military Education and Training	60.0			NC	Annex O: Common Military Education and Training	60.0							N/A
Total Academic Time	436.0				Total Academic Time	515.1							N/A
Administrative Time	8.0			NC	Administrative Time	8.0							
Inprocessing	8.0				Inprocessing	8.0							
Outprocessing	19.0				Outprocessing	19.0							
Commander's Time	9.0				Commander's Time	9.0							
Open Time					Open Time								
Total Nonacademic Time	44.0				Total Nonacademic Time	44.0							
Total Course Time	480.0				Total Course Time	559.1							
Training Time in Man-Days	60.0				Training Time in Man-Days	69.9							

MIL CW 2

Table C3-14 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE

COURSE 410-63R10 MOS 63R10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Instructional Breakdown C 35.8 D 5.9 TV 8.2 F 1.0 QC 4.0 PM 44.5 ST 3.0 SI 6.0 PE1 184.8 PE2 7.0 PE3 21.8 E1 54.0 Total 376.0					Instructional Breakdown C 74.2 D 5.9 TV 8.2 F 1.0 QC 4.0 PM 44.5 ST 3.0 SI 6.0 PE1 213.9 PE2 7.0 PE3 21.8 E1 63.1 E3 2.5 Total 455.1								

MIL CV

Table C3-15

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE

COURSE 611-63H10

MOS

63H10

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GC #
Annex A: Course/Soldier's Manual Orientation	1.0	C	52:1	NC	Annex A: Course/Soldier's Manual Orientation	1.0	C	52:1					N/A
	1.0	PM	20:1			1.0	PM	20:1					
Subtotal	2.0				Subtotal	2.0							
Annex B: Basic Maintenance Skills and Knowledge	34.9	C	52:1	NC	Annex B: Basic Maintenance Skills and Knowledge	34.9	C	52:1					N/A
	4.5	D	20:1			4.5	D	20:1					
	6.1	TV	52:1			6.1	TV	52:1					
	8.0	PEL	6:1			8.0	PEL	6:1					
	3.0	PEJ	52:1			3.0	PEJ	52:1					
	3.5	EJ	52:1			3.5	EJ	52:1					
Subtotal	60.0				Subtotal	60.0							
Annex C: M60A1 Tank Maintenance	5	TV	52:1	NC	Annex C: M60A1 Tank Maintenance	5	TV	52:1					N/A
	42.5	PEL	6:1			42.5	PEL	6:1					
	4.0	EI	4:1			4.0	EI	4:1					
Subtotal	47.0				Subtotal	47.0							
Annex D: M110 Self-Propelled Artillery Maintenance	9.0	PEL	6:1	NC	Annex D: M110 Self-Propelled Artillery Maintenance	9.0	PEL	6:1					N/A
	1.0	EI	6:1			1.0	EI	6:1					
Subtotal	10.0				Subtotal	10.0							
Annex E: M113A1 Armored Personnel Carrier (APC) Maintenance	4	TV	52:1	NC	Annex E: M113A1 Armored Personnel Carrier (APC) Maintenance	4	TV	52:1					N/A
	14.0	PEL	6:1			14.0	PEL	6:1					
	27.6	PEL	4:1			27.6	PEL	4:1					
	3.0	EI	4:1			3.0	EI	4:1					
Subtotal	45.0				Subtotal	45.0							
Annex F: Troubleshooting Fuel and Electrical Systems	13.0	PEL	4:1	NC	Annex F: Troubleshooting Fuel and Electrical Systems	13.0	PEL	4:1					N/A
	1.0	EI	6:1			1.0	EI	6:1					
Subtotal	14.0				Subtotal	14.0							
				ADD	Annex G: CSWS Launch System Component Arrangement and Function	3.3	C	52:1	From: Navy Course A-113-0044 Gun Mount 5"/54 HK42 MOD 9 + 10 Lesson Topic 16.1: Gun System Component Arrangement and Function	3.3	C	12:1	31
					Subtotal	2.5	PEL	6:1	Subtotal	2.5	PEL	6:1	
						5.8				5.8			

MIL CW-4

Table C3-15 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE 611-6.H10

MOS

63H10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
				ADD	Launch System Electrical Control Circuits	2.2	C	52:1	Lesson Topic 16.2: Gun Laying System Electrical Control Circuits	4.4	C	12:1	
				ADD	Launch System Hydraulic Circuits	4.1	C	52:1	Lesson Topic 16.3: Gun Laying System Hydraulic Circuits	4.1	C	12:1	
				ADD	Elevation & Electronic Servos Control Unit	.9	C	52:1	Lesson Topic 16.4: Train & Elevation + Electronic Servos Control Unit	1.7	C	12:1	
				ADD	Elevation Synchro Control Circuits	4.1 .9	C PE1	52:1 6:1	Lesson Topic 16.5: Train & Elevation Synchro Control Circuits	8.3 1.7	C PE1	12:1 6:1	
				ADD	Subtotal	5.0			Subtotal	10.0			
				ADD	Elevation Servo Amplifier	4.1 1.3	C PE1	52:1 6:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3 2.5	C PE1	12:1 6:1	
				ADD	Subtotal	5.4			Subtotal	10.8			
				ADD	Elevation Fault Isolation	4.1 1.3	C PE1	52:1 6:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3 2.5	C PE1	12:1 6:1	
				ADD	Subtotal	5.4			Subtotal	10.8			
				ADD	Elevation Planned Maintenance	2.9	PE1	6:1	Lesson Topic 16. Train & Elevation Planned Maintenance	5.8	PE1	6:1	
				ADD	Elevation Operation	7.1	PE1	6:1	Lesson Topic 16.9: Train & Elevation Operation	14.1	PE1	6:1	
				ADD	Examination	4.6 1.3	E1 E2	6:1 2:1	Performance Test	9.1	E1	1:1	
					Subtotal CSWS Launch System	44.7			Written Test	2.5	E3	12:1	
									Subtotal MK42 Gun Laying	79.1			

Table C3-15 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE BASELINE. 2

COURSE# 611-63H10

MOS

63H10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex G: Basic Recovery Skills and Knowledge Training	9.0 1.5 1.0 9.0 3.5 1.0 25.0	PM QC TV PE1 PE3 E3	20:1 20:1 52:1 6:1 20:1 52:1	NC	Annex H: Basic Recovery Skills and Knowledge Training	9.0 1.5 1.0 9.0 3.5 1.0 25.0	PM QC TV PE1 PE3 E3	20:1 20:1 52:1 6:1 20:1 52:1					N/A
Subtotal					Subtotal								
Annex H: M88A1 Recovery Vehicle Operation and Maintenance (Operator/Crew)	5.0 1.0 15.0 21.0	PM QC WC1	20:1 20:1 2:1	NC	Annex I: M88A1 Recovery Vehicle Operation and Maintenance (Operator/Crew)	5.0 1.0 15.0 21.0	PM QC WC1	20:1 20:1 2:1					N/A
Subtotal					Subtotal								
Annex I: Field Recovery Operations	4.5 .5 11.0 16.0	PM TV WC1	20:1 52:1 2:1	NC	Annex J: Field Recovery Operations	4.5 .5 11.0 16.0	PM TV WC1	20:1 52:1 2:1					N/A
Subtotal					Subtotal								
Annex J: Maintenance Refresher Trainer	15.0	PE1	6:1	NC	Annex K: Maintenance Refresher Trainer	15.0	PE1	6:1					N/A
Annex K: End-of-Course Examination	16.0	PE1	4:1	NC	Annex L: End-of-Course Examination	16.0	PE1	4:1					N/A
Total Classroom Time	271.0				Total Classroom Time	315.7							
Common Military Education and Training (CMET)	50.0			NC	Common Military Education and Training (CMET)	50.0							N/A
Total Academic Time	321.0				Total Academic Time	365.7							

Table C3-15 (Con't.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE 611-63H10 MOS 63H10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Administrative Time				NC	Administrative Time								N/A
Inputprocessing	8.0				Inputprocessing	8.0							
Outputprocessing	8.0				Outputprocessing	8.0							
Commander's Time	11.0				Commander's Time	11.0							
Open Time	24.0				Open Time	24.0							
Total Nonacademic Time	71.0				Total Nonacademic Time	71.0							
Total Course Time	392.0				Total Course Time	436.7							
Training Time in Man-Days	49.0				Training Time in Man-Days	54.6							
Instructional Breakdown					Instructional Breakdown								
C 35.9					C 58.7								
D 4.5				D 4.5									
PM 19.5				PM 19.5									
TV 8.5				TV 8.5									
QC 2.5				QC 2.5									
PE1 154.1				PE1 170.1									
PE3 6.5				PE3 6.5									
E1 9.0				E1 13.6									
E3 4.5				E3 5.8									
WC1 26.0				WC1 26.0									
Total 271.0				Total 315.7									

Table C3-16

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 3

COURSE

610-63W10

MOS

63W10

EXISTING COURSE INFORMATION				MODIFIED COURSE INFORMATION									
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex A: Orientation	2.6	C	24:1	NC	Annex A: Orientation	2.6	C	24:1					N/A
	1.4	PE3	20:1			1.4	PE3	20:1					
Subtotal	4.0				Subtotal	4.0							
Annex B: Basic Maintenance Skills/Knowledges	33.0	C	24:1	NC	Annex B: Basic Maintenance Skills/Knowledges	33.2	C	24:1					N/A
	3.6	TV	24:1			3.6	TV	24:1					
	5.9	D	20:1			5.9	D	20:1					
	10.5	PE1	6:1			10.5	PE1	6:1					
	5.3	PE3	20:1			5.3	PE3	20:1					
	.5	F	24:1			.5	F	24:1					
Subtotal	59.0				Subtotal	59.0							
Annex C: 1-1/4 Ton Vehicle Maintenance	.7	PM	20:1	NC	Annex C: 1-1/4 Ton Vehicle Maintenance	.7	PM	20:1					N/A
	.5	TV	24:1			.5	TV	24:1					
	24.4	PE1	6:1			24.4	PE1	6:1					
	.4	PE3	20:1			.4	PE3	20:1					
	6.0	E1	4:1			6.0	E1	4:1					
Subtotal	32.0				Subtotal	32.0							
Annex D: 14 Ton Vehicle Maintenance	6.0	PE1	6:1	NC	Annex D: 14 Ton Vehicle Maintenance	6.0	PE1	6:1					N/A
	.5	PE3	20:1			.5	PE3	20:1					
	3.0	E1	4:1			3.0	E1	4:1					
Subtotal	9.5				Subtotal	9.5							
Annex E: 5 Ton Vehicle Maintenance	1.0	PM	20:1	NC	Annex E: 5 Ton Vehicle Maintenance	1.0	PM	20:1					N/A
	22.5	PE1	6:1			22.5	PE1	6:1					
	1.5	PE2	6:1			1.5	PE2	6:1					
	7.0	E1	4:1			7.0	E1	4:1					
Subtotal	32.0				Subtotal	32.0							
Annex F: 2-1/2 Ton Vehicle Maintenance	.7	PM	20:1	NC	Annex F: 2-1/2 Ton Vehicle Maintenance	.7	PM	20:1					N/A
	.5	TV	24:1			.5	TV	24:1					
	16.7	PE1	4:1			16.7	PE1	4:1					
	.1	PE3	20:1			.1	PE3	20:1					
	6.0	E1	4:1			6.0	E1	4:1					
Subtotal	24.0				Subtotal	24.0							

Table C3-16 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE 1

COURSE

610-63410

MOS

63410

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	GG #
Annex G: 1/4 Ton Vehicle Maintenance	.9 .6 22.5 8.0 32.0	PM TV PE1 PE1	20:1 24:1 6:1 4:1	NC	Annex G: 1/4 Ton Vehicle Maintenance	.9 .6 22.5 8.0 32.0	PM TV PE1 PE1	20:1 24:1 6:1 4:1					N/A
Subtotal					Subtotal								
Annex H: Troubleshooting	3.0 3.0 6.0 1.0 14.0 1.0 3.0 31.0	PM ST SI QC PE1 PE2 EI	20:1 20:1 6:1 20:1 6:1 6:1 4:1	NC	Annex H: Troubleshooting	3.0 3.0 6.0 1.0 14.0 1.0 3.0 31.0	PM ST SI QC PE1 PE2 EI	20:1 20:1 6:1 20:1 6:1 6:1 4:1					N/A
Subtotal					Subtotal				From: Navy Course A-113-0044 Gun Mount S*/54 MK42 MOD 9+10				
				ADD	Annex I: CSWS Maintenance				Lesson Topic 16.1: Gun System Component Arrangement and Function	3.3 2.5 5.8	C PE1	12:1 6:1	31
				ADD	Launch System Component Arrangement and Function	3.3 2.5 5.8	C PE1	24:1 6:1	Lesson Topic 16.2: Gun Laying System Electrical Control Circuits	4.4	C	12:1	
				ADD	Subtotal				Lesson Topic 16.3: Gun Laying System Hydraulic Circuits	4.1	C	12:1	
				ADD	Launch System Electrical Control Circuits	2.2	C	24:1	Lesson Topic 16.4: Train & Elevation & Electronics Servos Control Unit	1.7	C	12:1	
				ADD	Launch System Hydraulic Circuits	4.1	C	24:1	Lesson Topic 16.5: Train & Elevation Synchro Control Circuits	8.3 1.7 10.0	C PE1	12:1 6:1	
				ADD	Elevation & Electronic Servos Control Unit	.9	C	24:1	Subtotal				
				ADD	Elevation Synchro Control Circuits	4.1 .9 5.0	C PE1	24:1 6:1					
					Subtotal								

Table C3-16 (Continued.)
COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 2

COURSE 610-6.H10 MOS 6.H10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION								
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES	HOURS	TYPE INSTRUCTION	S/I RATIO	CD #
Annex I: Basic Recovery Skill 177 Knowledge	12.0	PM	20:1	HC	Elevation Servo Amplifier	4.1	C	24:1	Lesson Topic 16.6: Train & Elevation Servo Amplifier	8.3	C	12:1	N/A
	1.2	TV	24:1		Subtotal	5.0	PE1	6:1	Subtotal	2.5	PE1	6:1	
	2.0	QC	20:1		Elevation Fault Isolation	4.1	C	24:1	Lesson Topic 16.7: Train & Elevation Fault Isolation	8.3	C	12:1	
	3.2	PE1	4:1		Subtotal	1.3	PE1	6:1	Subtotal	2.5	PE1	6:1	
	2.0	PE2	6:1		Elevation Planned Maintenance	5.4	PE1	6:1	Lesson Topic 16.8: Train & Elevation Planned Maintenance	10.8	PE1	6:1	
Annex J: 5 Ton Wrecker Operation	6.6	PE3	20:1	NC	Elevation Operation	2.9	PE1	6:1	Lesson Topic 16.9: Train & Elevation Operation	5.8	PE1	6:1	N/A
	27.0	PE1	20:1		Examination	7.1	PE1	6:1	Performance Test	9.1	E1	1:1	
	13.0	PM	20:1		Subtotal CSMS Launch System	4.6	E1	4:1	Written Test	2.5	E1	12:1	
	1.0	TV	24:1		Annex J: Basic Recovery Skill/Knowledges	44.7	E1	24:1	Subtotal MK42 Gun Laying	79.1	E1	12:1	
	1.0	QC	20:1		Annex K: 5 Ton Wrecker Operation	40.0	PE3	20:1			PE3	12:1	
Subtotal	17.0	2:1											
	1.0	6:1											
	4.5	20:1											
	2.0	2:1											
Subtotal	40.0												

MIL CW 4

Table C3-16 (Con't.)

COURSE MODIFICATION WORKSHEET

REFERENCE, BASELINE, ?

COURSE: 610-63W10 MOS: 63W10

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION				
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	MODIFICATION/DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUCTION	S/I RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES
Annex K: Heavy Equipment Transporter (HET) Operation	11.5 13.0 1.5 3.0 2.0 10.0	PM PE1 PE2 PE3 E1	20:1 2:1 6:1 20:1 2:1	NC	Annex L: Heavy Equipment Transporter (HET) Operation	11.5 13.0 1.5 3.0 2.0 10.0	PM PE1 PE2 PE3 E1	20:1 2:1 6:1 20:1 2:1	
Subtotal	10.0				Subtotal	10.0			
Annex L: Maintenance Review	1.7 .8 24.0 3.0 1.0 30.5	PM TV PE1 PE2 PE1	20:1 24:1 6:1 4:1 6:1	NC	Annex M: Maintenance Review	1.7 .8 24.0 3.0 1.0 30.5	PM TV PE1 PE2 PE1	20:1 24:1 6:1 4:1 6:1	
Subtotal	30.5				Subtotal	30.5			
Annex N: End of Course Examination	25.0	E1	4:1	NC	Annex N: End of Course Examination	25.0	E1	4:1	
Total Classroom Time	376.0				Total Classroom Time	420.7			
Annex O: Common Military Education and Training	60.0			NC	Annex O: Common Military Education and Training	60.0			
Total Academic Time	436.0				Total Academic Time	480.7			
Administrative Time	8.0			NC	Administrative Time	8.0			
Outprocessing	8.0				Outprocessing	8.0			
Commander's Time	19.0				Commander's Time	19.0			
Open Time	9.0				Open Time	9.0			
Total Nonacademic Time	44.0				Total Nonacademic Time	44.0			
Total Course Time	480.0				Total Course Time	524.7			
Training Time in Man-Days	60.0				Training Time in Man-Days	65.6			

Table C3-16 (Con't.)

COURSE MODIFICATION WORKSHEET
REFERENCE, BASELINE 1

COURSE 610-61010

MOS

61010

EXISTING COURSE INFORMATION					MODIFIED COURSE INFORMATION				
COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUC TION	ST/ RATIO	MODIFICA TION/ DELETION CODE	COURSE ANNEXES, FILES, AND OBJECTIVES	HOURS	TYPE INSTRUC TION	ST/ RATIO	COURSE ANNEXES, FILES, AND OBJECTIVES USED TO PROJECT ADDED MODULES
Instructional Breakdown					Instructional Breakdown				
C 15.8					C 50.6				
D 5.9					D 5.9				
TV 0.2					TV 0.2				
F 1.0					F 1.0				
QC 4.0					QC 4.0				
PM 44.5					PM 44.5				
ST 1.0					ST 1.0				
RI 6.0					RI 6.0				
PE1 104.8					PE1 100.8				
PE2 7.0					PE2 7.0				
PE3 21.8					PE3 21.6				
R1 14.0					R1 50.6				
					R1 1.3				
Total 176.0					Total 420.7				

Table C3-17. New and Modified Courses by System.

COURSE NUMBER	COURSE TITLE	REFERENCE		BASELINES		
		TRACKED	WHEELED	I LANCE	MLIS	LANCE II
Operator:						
043-15XXX	* CSWS Crewman	1	1	2	3	4
Maintenance:						
ASIXX	* CSWS Mechanic	5	5	5	6	7
121-27B10	LCSS Tech Specialist/LANCE Repair	8	8	8	8	8
101-31E20	Field Radio Repair	9	9	10	10	10
101-31V10	Tactical Comm. Sys. Op/Mech	11	11	NC	NC	NC
198-35E10	Special Electronic Devices Repairer	12	12	12	12	12
611-63H10	Track Vehicle Repairer	13	--	13	14	--
610-63W10	Wheel Vehicle Repairer	NC	15	NC	NC	16

NC No change from existing course

-- No course assigned to system

* New course

APPENDIX C4
TRAINING RESOURCES

APPENDIX C4

TRAINING RESOURCES

C4.1 DETERMINATION OF TRAINING MAN-DAYS

Data for determining training man-days came from two sources. For those courses that were not affected by changes in the CSWS equipment configurations, the training time was taken directly from the program of instruction (POI). The courses affected were modified using the course modification worksheets found in Appendix C3. Where course lengths were found in weeks, .2 weeks of instruction equals one 1 man-day.

Tables C4.1-1 - C4.1-5 list the training man-day requirements of the CSWS courses by system. Each table contains two sets of information. The first set lists the training man-day requirements for each course. The second set uses the man-days by course from the first set and multiplies them by a modified student load obtained from the personnel analyses in Section 6. This gives the annual training man-day requirements for each course.

TABLE C4.1-1 TRAINING MANDAY REQUIREMENTS
SYSTEM: TRACKED REFERENCE

MOS	EXISTING COURSE	DELTA	PROPOSED COURSE
15XX	0.0	30.8	30.8
AS1	0.0	16.6	16.6
27B	158.0	15.0	173.0
31E	125.0	10.0	135.0
31S	65.0	0.0	65.0
31V	52.0	0.6	52.6
35E	90.0	7.6	97.6
35H	10.0	0.0	10.0
52C	57.0	0.0	57.0
54E	43.0	0.0	43.0
63G	55.0	0.0	55.0
63H	49.0	9.9	58.9
63J	38.0	0.0	38.0
63S	43.0	0.0	43.0
63W	60.0	0.0	60.0
63Y	33.0	0.0	33.0

MOS	DELTA MANDAYS	PROPOSED MANDAYS	ANNUAL LOAD	ANNUAL DELTA MANDAYS	ANNUAL PROPOSED MANDAYS
15XX	30.8	30.8	984.0	30307.2	30307.2
AS1	16.6	16.6	357.0	5926.2	5926.2
27B	15.0	173.0	136.0	2040.0	23528.0
31E	10.0	135.0	127.0	1270.0	17145.0
31S	0.0	65.0	9.0	0.0	585.0
31V	0.6	52.6	239.0	143.4	12571.4
35E	7.6	97.6	220.0	1672.0	21472.0
35H	0.0	10.0	8.0	0.0	80.0
52C	0.0	57.0	171.0	0.0	9747.0
54E	0.0	43.0	16.0	0.0	688.0
63G	0.0	55.0	20.0	0.0	1100.0
63H	9.9	58.9	371.0	3672.9	21851.9
63J	0.0	38.0	71.0	0.0	2698.0
63S	0.0	43.0	133.0	0.0	5719.0
	0.0	60.0	241.0	0.0	14460.0
	0.0	33.0	206.0	0.0	6798.0
TOTAL	90.5	968.5	3309.0	45031.7	174676.7

TABLE C4.1-2 TRAINING MANDAY REQUIREMENTS
SYSTEM: WHEELED REFERENCE

MOS	EXISTING COURSE	DELTA	PROPOSED COURSE
15XX	0.0	30.8	30.8
AS1	0.0	16.6	16.6
27B	158.0	15.0	173.0
31E	125.0	10.0	135.0
31S	65.0	0.0	65.0
31V	52.0	0.6	52.6
35E	90.0	7.6	97.6
35H	10.0	0.0	10.0
52C	57.0	0.0	57.0
54E	43.0	0.0	43.0
63G	55.0	0.0	55.0
63H	49.0	0.0	49.0
63J	38.0	0.0	38.0
63S	43.0	0.0	43.0
63W	60.0	9.9	69.9
63Y	33.0	0.0	33.0

MOS	DELTA MANDAYS	PROPOSED MANDAYS	ANNUAL LOAD	ANNUAL DELTA MANDAYS	ANNUAL PROPOSED MANDAYS
15XX	30.8	30.8	984.0	30307.2	30307.2
AS1	16.6	16.6	335.0	5561.0	5561.0
27B	15.0	173.0	105.0	1575.0	18165.0
31E	10.0	135.0	119.0	1190.0	16065.0
31S	0.0	65.0	9.0	0.0	585.0
31V	0.6	52.6	239.0	143.4	12571.4
35E	7.6	97.6	137.0	1041.2	13371.2
35H	0.0	10.0	8.0	0.0	80.0
52C	0.0	57.0	90.0	0.0	5130.0
54E	0.0	43.0	16.0	0.0	688.0
63G	0.0	55.0	40.0	0.0	2200.0
63H	0.0	49.0	0.0	0.0	0.0
63J	0.0	38.0	61.0	0.0	2318.0
63S	0.0	43.0	111.0	0.0	4773.0
63W	9.9	69.9	420.0	4158.0	29358.0
63Y	0.0	33.0	0.0	0.0	0.0
TOTAL	90.5	968.5	2674.0	43975.8	141172.8

TABLE C4.1-3 TRAINING MANDAY REQUIREMENTS
SYSTEM: I LANCE

MOS	EXISTING COURSE	DELTA	PROPOSED COURSE
15XX	0.0	40.9	40.9
AS1	0.0	16.6	16.6
27B	158.0	15.0	173.0
31E	125.0	15.0	140.0
31S	65.0	0.0	65.0
31V	52.0	0.0	52.0
35E	90.0	7.6	97.6
35H	10.0	0.0	10.0
52C	57.0	0.0	57.0
54E	43.0	0.0	43.0
63G	55.0	0.0	55.0
63H	49.0	9.9	58.9
63J	38.0	0.0	38.0
63S	43.0	0.0	43.0
63W	60.0	0.0	60.0
63Y	33.0	0.0	33.0

MOS	DELTA MANDAYS	PROPOSED MANDAYS	ANNUAL LOAD	ANNUAL DELTA MANDAYS	ANNUAL PROPOSED MANDAYS
15XX	40.9	40.9	984.0	40245.6	40245.6
AS1	16.6	16.6	335.0	5561.0	5561.0
27B	15.0	173.0	126.0	1890.0	21798.0
31E	15.0	140.0	48.0	720.0	6720.0
31S	0.0	65.0	9.0	0.0	585.0
31V	0.0	52.0	100.0	0.0	5200.0
35E	7.6	97.6	28.0	212.8	2732.8
35H	0.0	10.0	8.0	0.0	80.0
52C	0.0	57.0	201.0	0.0	11457.0
54E	0.0	43.0	16.0	0.0	688.0
63G	0.0	55.0	10.0	0.0	550.0
63H	9.9	58.9	199.0	1970.1	11721.1
63J	0.0	38.0	132.0	0.0	5016.0
63S	0.0	43.0	88.0	0.0	3784.0
63W	0.0	60.0	252.0	0.0	15120.0
63Y	0.0	33.0	103.0	0.0	3399.0
TOTAL	105.0	983.0	2639.0	50599.5	134657.5

TABLE C4.1-4 TRAINING MANDAY REQUIREMENTS
SYSTEM: MLIS

MOS	EXISTING COURSE	DELTA	PROPOSED COURSE
15XX	0.0	40.7	40.7
AS1	0.0	11.9	11.9
27B	158.0	15.0	173.0
31E	125.0	15.0	140.0
31S	65.0	0.0	65.0
31V	52.0	0.0	52.0
35E	90.0	7.6	97.6
35H	10.0	0.0	10.0
52C	57.0	0.0	57.0
54E	43.0	0.0	43.0
63G	55.0	0.0	55.0
63H	49.0	5.6	54.6
63J	38.0	0.0	38.0
63S	43.0	0.0	43.0
63W	60.0	0.0	60.0
63Y	33.0	0.0	33.0

MOS	DELTA MANDAYS	PROPOSED MANDAYS	ANNUAL LOAD	ANNUAL DELTA MANDAYS	ANNUAL PROPOSED MANDAYS
15XX	40.7	40.7	984.0	40048.8	40048.8
AS1	11.9	11.9	223.0	2653.7	2653.7
27B	15.0	173.0	63.0	945.0	10899.0
31E	15.0	140.0	41.0	615.0	5740.0
31S	0.0	65.0	9.0	0.0	585.0
31V	0.0	52.0	100.0	0.0	5200.0
35E	7.6	97.6	28.0	212.8	2732.8
35H	0.0	10.0	8.0	0.0	80.0
52C	0.0	57.0	80.0	0.0	4560.0
54E	0.0	43.0	16.0	0.0	688.0
63G	0.0	55.0	10.0	0.0	550.0
63H	5.6	54.6	124.0	694.4	6770.4
63J	0.0	38.0	71.0	0.0	2698.0
63S	0.0	43.0	111.0	0.0	4773.0
63W	0.0	60.0	199.0	0.0	11940.0
63Y	0.0	33.0	41.0	0.0	1353.0
TOTAL	95.8	973.8	2108.0	45169.7	101271.7

TABLE C4.1-5 TRAINING MANDAY REQUIREMENTS

SYSTEM: LANCE II

MOS	EXISTING COURSE	DELTA	PROPOSED COURSE
15XX	0.0	34.0	34.0
ASI	0.0	12.0	12.0
27B	158.0	15.0	173.0
31E	125.0	15.0	140.0
31S	65.0	0.0	65.0
31V	52.0	0.0	52.0
35E	90.0	7.6	97.6
35H	10.0	0.0	10.0
52C	57.0	0.0	57.0
54E	43.0	0.0	43.0
63G	55.0	0.0	55.0
63H	49.0	0.0	49.0
63J	38.0	0.0	38.0
63S	43.0	0.0	43.0
63W	60.0	5.6	65.6
63Y	33.0	0.0	33.0

MOS	DELTA MANDAYS	PROPOSED MANDAYS	ANNUAL LOAD	ANNUAL DELTA MANDAYS	ANNUAL PROPOSED MANDAYS
15XX	34.0	34.0	984.0	33456.0	33456.0
ASI	12.0	12.0	268.0	3216.0	3216.0
27B	15.0	173.0	105.0	1575.0	18165.0
31E	15.0	140.0	48.0	720.0	6720.0
31S	0.0	65.0	9.0	0.0	585.0
31V	0.0	52.0	100.0	0.0	5200.0
35E	7.6	97.6	28.0	212.8	2732.8
35H	0.0	10.0	8.0	0.0	80.0
52C	0.0	57.0	121.0	0.0	6897.0
54E	0.0	43.0	16.0	0.0	688.0
63G	0.0	55.0	20.0	0.0	1100.0
63H	0.0	49.0	0.0	0.0	0.0
63J	0.0	38.0	102.0	0.0	3876.0
63S	0.0	43.0	221.0	0.0	9503.0
63W	5.6	65.6	294.0	1646.4	19286.4
63Y	0.0	33.0	0.0	0.0	0.0
TOTAL	89.2	967.2	2324.0	40826.2	111505.2

The personnel analysis does not take into account course attrition. In order to determine an approximation of this personnel factor, the Cost Analysis Program (MOS Training Costs) RCS ATRM-159 report from the Ordnance School was analyzed and attrition for CSWS courses or courses similar to those associated with CSWS was determined.

Overall it was found that the attrition rate was 8% for these courses. The personnel requirements for all MOS were increased by this factor to insure that at the conclusion of training, there would be sufficient personnel to man the various CSWS configurations.

C4.2 DETERMINATION OF NUMBER OF INSTRUCTORS

There were four steps involved in the determination of the number of instructors for the CSWS study. These steps follow directly the instructor determination algorithm found in the Staffing Guide for U.S. Army Service Schools (DA Pam 570-558). During the first step, worksheets were developed for each course by system in order to list the hours of instruction for each type of instruction associated with each course. The data for these worksheets were taken from the Program of Instruction (POI) for those courses not modified for CSWS and from the course modification

worksheets in Appendix C3 for those courses that were affected by the CSWS equipment configurations.

During the second step, the total number of instructor contact hours (ICH) for each course were determined. A second worksheet was used to list each course by system with the proposed type and hours of instruction developed in the first step. The number of sections and groups was then determined for each type of instruction. This information was taken from the ICH Computation Worksheet (TRADOC Form 377-R) for those POI that included them. DRC encountered difficulties in obtaining ICH worksheets for some POI. Where these difficulties occurred, the optimum class sizes were obtained and sections and groups were determined based on the student/instructor ratios recommended by either TRADOC Cir 351-12 or DA Pam 570-558.

The third and fourth steps in the instructor determination process are found in Tables C4.2-1 - C4.2-5. These tables include the MOS and total POI ICH developed in the previous steps. In step three the total POI ICH is multiplied by the course frequency to determine the total, annual ICH for each course. Course frequency is determined by dividing the proposed student load by the existing optimum class size.

Table C4.2-1 Instructor Requirements
System: Tracked Reference

MOS	TOTAL POI DELTA	ICH NEW	COURSE FREQ	TOTAL ANNUAL DELTA	ICH NEW	NUMBER OF INSTRUCTORS
15XX	345.0	345.0	82.0	23290.0	23290.0	22.6
ASI	127.9	127.9	71.4	9132.1	9132.1	7.3
278	206.0	2273.3	22.6	4655.6	51376.6	41.1
31E	190.2	3518.4	6.4	1217.3	22517.3	18.0
31S	0.0	1336.2	0.8	0.0	1069.0	0.9
31U	27.6	2071.6	6.8	137.7	14036.9	11.3
35E	201.6	1700.5	11.0	2217.6	13705.5	15.0
35H	0.0	127.0	1.3	0.0	165.1	0.1
52C	0.0	831.6	9.5	0.0	7900.2	6.3
54E	0.0	1356.5	0.7	0.0	949.5	0.8
63G	0.0	538.0	1.7	0.0	914.6	0.7
63H	421.1	2735.9	7.1	2989.8	19424.9	15.5
63J	0.0	483.6	5.9	0.0	2353.2	2.3
63S	0.0	1282.1	3.8	0.0	4372.0	3.9
63W	0.0	1304.6	10.0	0.0	13046.0	10.4
63Y	0.0	807.4	10.3	0.0	8316.2	6.7

Table C4.2-1 Instructor Requirements
System: Tracked Reference

MOS	TOTAL DELTA	POI NEW	ICH NEW	COURSE FREQ	TOTAL ANNUAL DELTA	ICH NEW	NUMBER OF INSTRUCTORS
15XX	345.0		345.0	82.0	28290.0	28290.0	22.6
ASI	127.9		127.9	71.4	9132.1	9132.1	7.3
27B	286.0		2273.3	22.6	4655.6	51376.6	41.1
31E	190.2		3518.4	6.4	1217.3	22517.3	18.0
31S	0.0		1336.2	0.8	0.0	1069.0	0.9
31U	27.6		2071.6	6.8	137.7	14036.9	11.3
35E	201.6		1700.5	11.0	2217.6	18705.5	15.0
35H	0.0		127.0	1.3	0.0	165.1	0.1
52C	0.0		831.6	9.5	0.0	7900.2	6.3
54E	0.0		1356.5	0.7	0.0	949.5	0.8
63G	0.0		538.0	1.7	0.0	914.6	0.7
63H	421.1		2735.9	7.1	2939.8	19424.9	15.5
63J	0.0		483.6	5.9	0.0	2353.2	2.3
63S	0.0		1282.1	3.8	0.0	4872.0	3.9
63W	0.0		1384.6	10.0	0.0	13046.0	10.4
63Y	0.0		807.4	10.3	0.0	8316.2	6.7

Table C4.2-3 Instructor Requirements
System: I Lance

MOS	TOTAL POI DELTA	ICH NEW	COURSE FREQ	TOTAL ANNUAL DELTA	ICH NEW	NUMBER OF INSTRUCTORS
15XX	473.4	473.4	32.0	39223.3	39223.3	31.4
AGI	127.9	127.9	67.0	3569.3	3569.3	6.9
27B	306.0	3273.3	21.0	4326.0	47739.3	33.2
31E	349.2	3677.4	2.4	333.1	3325.3	7.1
31S	0.0	1336.2	0.3	0.0	1069.0	0.9
31U	0.0	2046.4	2.3	0.0	5729.9	4.6
35E	201.6	1700.5	1.4	232.2	2330.7	1.9
35H	0.0	127.0	1.3	0.0	165.1	0.1
52C	0.0	331.6	11.2	0.0	9313.9	7.5
54E	0.0	1356.5	0.7	0.0	949.5	0.3
63G	0.0	533.0	0.3	0.0	430.4	0.3
63H	421.1	2735.9	3.3	1600.2	10396.4	3.3
63J	0.0	433.6	11.0	0.0	5319.6	4.3
63S	0.0	1232.1	2.5	0.0	3205.2	2.6
63W	0.0	1304.6	10.5	0.0	13693.3	11.0
63Y	0.0	307.4	5.1	0.0	4153.1	3.3

Table C4.2-4 Instructor Requirements
System: MLIS

MOS	TOTAL POI DELTA	ICH NEW	COURSE FREQ	TOTAL ANNUAL DELTA	ICH NEW	NUMBER OF INSTRUCTORS
15XX	474.6	474.6	32.0	33917.2	33917.2	31.1
RSI	90.0	90.0	44.6	4014.0	4014.0	3.2
27B	206.0	2273.3	10.5	2163.0	23369.6	19.1
31E	349.2	3677.4	2.1	733.3	7722.5	6.2
31S	0.0	1336.2	0.3	0.0	1069.0	0.9
31U	0.0	2046.4	2.9	0.0	5934.6	4.7
35E	201.6	1700.5	1.4	232.2	2330.7	1.9
35H	0.0	127.0	1.3	0.0	165.1	0.1
52C	0.0	331.6	4.4	0.0	3659.0	2.9
54E	0.0	1356.5	0.7	0.0	949.5	0.3
63G	0.0	533.0	0.3	0.0	430.4	0.3
63H	227.9	2542.7	2.3	524.2	5048.2	4.7
63J	0.0	433.6	5.9	0.0	2353.2	2.3
63S	0.0	1232.1	3.2	0.0	4102.7	3.3
63W	0.0	1304.6	3.3	0.0	10323.2	3.7
63Y	0.0	307.4	2.1	0.0	1695.5	1.4

Table C4.2-5 Instructor Requirements
System: Lance II

MOS	TOTAL DELTA	FOI NEW	ICH NEW	COURSE FREQ	TOTAL ANNUAL DELTA	ICH NEW	NUMBER OF INSTRUCTORS
15XX	384.9		384.9	82.0	31561.8	31561.8	25.2
ASI	90.9		90.9	53.6	4872.2	4872.2	3.9
278	206.0		2273.3	17.5	3605.0	39782.7	31.8
31E	349.2		3677.4	2.4	836.1	8825.8	7.1
31S	0.0		1336.2	0.8	0.0	1069.0	0.9
31U	0.0		2046.4	3.0	0.0	6139.2	4.9
35E	201.6		1700.5	1.4	282.2	2380.7	1.9
35H	0.0		127.0	1.3	0.0	165.1	0.1
52C	0.0		831.6	6.7	0.0	5571.7	4.5
54E	0.0		1356.5	0.7	0.0	949.5	0.8
63G	0.0		538.0	1.7	0.0	914.6	0.7
63H	0.0		0.0	0.0	0.0	0.0	0.0
63J	0.0		483.6	8.5	0.0	4110.6	3.3
63S	0.0		1282.1	6.3	0.0	8077.2	6.5
63U	122.2		1426.8	12.3	1503.1	17549.6	14.0
63Y	0.0		0.0	0.0	0.0	0.0	0.0

In step 4, the number of required instructors is determined by dividing the total, annual ICH for each course by 1250 which is the annual amount of instructor contact specified for an instructor in DA Pam 570-558. The algorithm used to determine instructor requirements is summarized as follows.

$$NI = \frac{TICH}{OCS} \times SL \quad 1250$$

where NI is the number of instructors required for the course; TICH is the total, annual instructor contact hours for the course; OCS is the optimum class size for the course; SI is the proposed student load determined from the personnel analysis; and 1250 is the annual amount of instructor contact specified by DA Pam 570-558.

C4.3 Determination of Training Course Costs

Estimates of the cost per graduate for all CSWS courses were determined directly from computer printouts of the Army Cost Analysis Program (MOS Training Costs) (RCS ATRM-159 (R1), TRADOC Reg 11-5). The data used was the latest MOS course cost data available (FY 1980) and had been converted to FY 1982 dollars.

Of the 16 courses affected by CSWS, seven had the same number of POI man-days as in FY 1980 and appeared to have not changed. Five of the courses had had changes in the POI man-days but appeared to be essentially the same courses.

121-27B10	LCSS Test Specialist/LANCE Repairer
160-31S10	Field General COMSEC Repairer
198-35E10	Special Electronic Devices Repairer
610-63G10	Fuel & Electrical System Repairer
690-63J10	Quartermaster & Chemical Equipment Repairer

Three of the courses were new and were not in existence in FY1980:

610-63S10	Heavy Wheel Vehicle Mechanic
610-63W20	Wheel Vehicle Repairer
611-63Y10	Track Vehicle Mechanic

These courses, as well as two of the courses that had been modified (63G and 63J), were the result of a restructuring of CMF 63 that went into effect during the past year. One of the CSWS courses is an Air Force course for which no course cost data was available: 3AZR32470-000 Radiac Instrument Repair & Calibration.

The first step in determining training course costs was to obtain a per graduate course cost that reflected the current POI being taught. The only data available for both the old and new courses was the length of each course. Since the impact on costs of changing course length affects only the variable cost per graduate, the following algorithm was used to project new course costs.

$$\left(\frac{\Sigma V}{OCL} \times NCL \right) + \Sigma F = NCPG$$

where ΣV is the sum of the variable costs; OCL is the old course length; NCL is the new course length; ΣF is the sum of the fixed costs; and NCPG is the new cost per graduate.

For the seven courses that had not changed, no modifications in course costs were necessary. For the remainder of the courses, it was possible to use this algorithm to create a new course cost using the old and new (existing POI) course lengths. For the three new courses, the courses from which they had split were considered to be most like the new courses and were, therefore, used as a basis upon which to project the new course cost. These courses were as follows:

Existing

<u>MOS</u>	<u>Course Used to Project New Course Cost</u>
63S	610-63B10 Wheel Vehicle Mechanic
63W	610-63H10 Automotive Repairer
63Y	611-63C10 Track Vehicle Mechanic

The Air Force course for which no course cost data was available is a joint services course that all the services use to train radiac maintenance personnel. The Army typically sends a Calibration Specialist (35H) to this course. Since the entry level course for the 35H MOS has recently been revised and has no course cost data available, its predecessor 198-35B10 Electronic Instrument Repair Course was used to project a new course cost.

Once per graduate course costs for each of the existing programs of instruction had been derived, new course costs were then projected to reflect the course modifications and student loads dictated by the CSWS design configurations. The algorithm used to obtain the new CSWS course costs is as follows:

$$\left(\frac{\Sigma V}{OCL} \times NCL \right) + \frac{\Sigma F \times CNG}{NNG + CNG} = NCPG$$

where ΣV is the sum of the variable costs; OC_0 is the old course length; NCL is the new course length; ΣF is the sum of the fixed costs; CNG is the current norm graduates (taken from the ATRM-159 report); NNG is the new norm graduates required for CSWS; and $NCPG$ is the new cost per graduate.

Tables C4.3-1 - C4.3-5 list the annual training course costs for each system. Contained on these worksheets are the new proposed costs per graduate for each student multiplied by the annual training load. As mentioned previously in Appendix C4.1, the number of personnel needed to man the CSWS systems was modified to reflect the affects of course attrition which is not part of the personnel analysis. The final column contains the total, annual training cost for each course.

Table C4.3-1 Annual Training Course Costs
System: Tracked Reference

MOS	PER STUDENT COST	ANNUAL LOAD	ANNUAL COSTS
15XX	5802.0	984.0	5709168.0
AS1	3131.0	357.0	1117767.0
27B	30418.0	136.0	4136848.0
31E	19666.0	127.0	2497582.0
31S	8648.0	9.0	77832.0
31V	7994.0	239.0	1910566.0
35E	19531.0	220.0	4296820.0
35H	9008.0	8.0	72064.0
52C	13693.0	171.0	2341503.0
54E	10931.0	16.0	174896.0
63G	14774.0	20.0	295480.0
63H	9142.0	371.0	3391682.0
63J	8099.0	71.0	575029.0
63S	3626.0	133.0	482258.0
63W	15460.0	241.0	3725860.0
63Y	5706.0	206.0	1175436.0
TOTAL			31980791.0

Table C4.3-2 Annual Training Course Costs
System: Wheeled Reference

MOS	PER STUDENT COST	ANNUAL LOAD	ANNUAL COSTS
15XX	5281.0	984.0	5196504.0
ASI	3146.0	335.0	1053910.0
27B	31919.0	105.0	3351495.0
31E	19751.0	119.0	2350369.0
31S	8648.0	9.0	77832.0
31V	7994.0	239.0	1910566.0
35E	20733.0	137.0	2840421.0
35H	9007.0	8.0	72056.0
52C	14482.0	90.0	1303380.0
54E	10931.0	16.0	174896.0
63G	14491.0	40.0	579640.0
63H	0.0	0.0	0.0
63J	8200.0	61.0	500200.0
63S	3632.0	111.0	403152.0
63W	12883.0	420.0	5410860.0
63Y	0.0	0.0	0.0
TOTAL			25225281.0

Table C4.3-3 Annual Training Course Costs
System: I Lance

MOS	PER STUDENT COST	ANNUAL LOAD	ANNUAL COSTS
15XX	6664.0	984.0	6557376.0
ASI	3146.0	335.0	1053910.0
27B	30843.0	126.0	3886218.0
31E	21138.0	48.0	1014624.0
31S	8648.0	9.0	77832.0
31V	8186.0	100.0	818600.0
35E	11155.0	28.0	312340.0
35H	9008.0	8.0	72064.0
52C	13445.0	201.0	2702445.0
54E	10931.0	16.0	174896.0
63G	14923.0	10.0	149230.0
63H	9388.0	199.0	1868212.0
63J	7567.0	132.0	998844.0
63S	3638.0	88.0	320144.0
63W	11818.0	252.0	2978136.0
63Y	5781.0	103.0	595443.0
TOTAL			23530314.0

Table C4.3-4 Annual Training Course Costs
System: MLIS

MOS	PER STUDENT COST	ANNUAL LOAD	ANNUAL COSTS
15XX	6636.0	984.0	6529824.0
AS1	2449.0	223.0	546127.0
27B	35313.0	63.0	2224719.0
31E	21236.0	41.0	870676.0
31S	8648.0	9.0	77832.0
31V	8186.0	100.0	818600.0
35E	23297.0	28.0	652316.0
35H	9008.0	8.0	72064.0
52C	14595.0	80.0	1167600.0
54E	10931.0	16.0	174896.0
63G	14923.0	10.0	149230.0
63H	9997.0	124.0	1239628.0
63J	8099.0	71.0	575029.0
63S	3632.0	111.0	403152.0
63W	11897.0	199.0	2367503.0
63Y	5829.0	41.0	238989.0
TOTAL			18108185.0

Table C4.3-5 Annual Training Course Costs
System: Lance II

MOS	PER STUDENT COST	ANNUAL LOAD	ANNUAL COSTS
15XX	5719.0	984.0	5627496.0
AS1	2410.0	268.0	645880.0
27B	31919.0	105.0	3351495.0
31E	21136.0	48.0	1014528.0
31S	8648.0	9.0	77832.0
31V	8186.0	100.0	818600.0
35E	23297.0	28.0	652316.0
35H	9008.0	8.0	72064.0
52C	14157.0	121.0	1712997.0
54E	10931.0	16.0	174896.0
63G	14774.0	20.0	295480.0
63H	0.0	0.0	0.0
63J	7813.0	102.0	796926.0
63S	3603.0	221.0	796263.0
63W	12491.0	294.0	3672354.0
63Y	0.0	0.0	0.0
TOTAL			19709127.0

APPENDIX D
PERSONNEL REQUIREMENTS ANALYSIS

This appendix includes the detailed results of the Personnel Requirements Analysis. The contents of Appendix D1 are the personnel flow rates; (1) attrition; (2) promotion; and (3) TTHS overhead percentages. The variation of rates among MOSs and paygrades may be a result of Career Management Field (CMF) structure differences, bonus levels, internal or external policy changes. The importance in measuring these above loss rates is to estimate the quantities and qualities of personnel replacements needed to support present or future system specific manpower requirements.

Appendix D2 contains the personnel requirements for the reference system and baseline systems by MOS/paygrade. Personnel requirement structures will vary according to input rates and the level and quantity of manpower requirements within each MOS. Table 6-2 is an example of the impact of personnel structures given equal quantities of manpower requirement distributed at different skill levels.

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APPENDIX D1
PERSONNEL FLOW RATES

Table D-1. Personnel Flow Rates.

MOS = 15XX

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TIHS</u>
E-1	0.	0.516	1.308	0.
E-2	0.	0.360	1.756	0.050
E-3	0.	0.264	0.904	0.046
E-4	0.	0.360	0.268	0.048
E-5	0.	0.240	0.240	0.030
E-6	0.	0.144	0.148	0.027

MOS = ASI

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TIHS</u>
E-1	0.	0.516	1.308	0.
E-2	0.	0.360	1.756	0.050
E-3	0.	0.264	0.904	0.046

MOS = 27B

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TIHS</u>
E-1	0.	0.336	1.652	0.
E-2	0.	0.228	1.368	0.050
E-3	0.	0.192	1.224	0.046
E-4	0.	0.280	0.376	0.037
E-5	0.	0.432	0.224	0.038

MOS = 31E

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TIHS</u>
E-1	0.	0.556	1.412	0.
E-2	0.	0.336	1.432	0.013
E-3	0.	0.180	1.044	0.121
E-4	0.	0.324	0.356	0.062
E-5	0.	0.228	0.084	0.042

Table D-1. (Con't.)

MOS = 31S

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.256	1.840	0.
E-2	0.	0.344	1.252	0.170
E-3	0.	0.200	1.064	0.169
E-4	0.	0.364	0.468	0.110

MOS = 31V

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.428	1.272	0.
E-2	0.	0.260	1.772	0.080
E-3	0.	0.188	0.928	0.070

MOS = 35E

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.320	1.456	0.
E-2	0.	0.156	1.960	0.050
E-3	0.	0.176	1.044	0.048
E-4	0.	0.408	0.380	0.068

MOS = 35H

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.284	1.700	0.
E-2	0.	0.268	1.528	0.210
E-3	0.	0.212	1.064	0.201
E-4	0.	0.264	0.508	0.120

Table D-1. (Con't.)

MOS = 52C

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>ITHS</u>
E-1	0.	0.384	1.320	0.
E-2	0.	0.292	1.916	0.051
E-3	0.	0.220	0.972	0.043
E-4	0.	0.400	0.084	0.031

MOS = 54E

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>ITHS</u>
E-1	0.	0.340	1.548	0.
E-2	0.	0.232	1.724	0.058
E-3	0.	0.176	0.868	0.048

MOS = 63G

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>ITHS</u>
E-1	0.	0.336	1.512	0.
E-2	0.	0.372	1.664	0.055
E-3	0.	0.272	0.900	0.045
E-4	0.	0.524	0.260	0.042

MOS = 63H

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>ITHS</u>
E-1	0.	0.312	1.744	0.
E-2	0.	0.412	1.812	0.059
E-3	0.	0.416	0.948	0.049
E-4	0.	0.636	0.324	0.052

Table D-1. (Con't.)

MOS = 63J

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.416	1.608	0.
E-2	0.	0.344	1.732	0.050
E-3	0.	0.252	0.940	0.040
E-4	0.	0.268	0.132	0.033

MOS = 63S

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.260	1.788	0.
E-2	0.	0.272	1.908	0.033
E-3	0.	0.436	1.084	0.023
E-4	0.	0.528	0.120	0.035

MOS = 63W

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.276	1.136	0.
E-2	0.	0.296	1.960	0.051
E-3	0.	0.304	0.992	0.041
E-4	0.	0.432	0.260	0.039

MOS = 63Y

<u>PAYGRADE</u>	<u>MANPOWER</u>	<u>ATTRITION</u>	<u>UPGRADE</u>	<u>TTHS</u>
E-1	0.	0.308	1.712	0.
E-2	0.	0.236	2.120	0.040
E-3	0.	0.344	1.056	0.030
E-4	0.	0.532	0.232	0.040

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APPENDIX D2
IMPACT MODEL RESULTS

Table D2-1. Tracked Reference.

MOS = 15XX		RECRUITS PER YEAR = 905.5				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	496.4	0.	0.	905.5	0.	905.5
E-2	306.9	0.	0.	649.3	0.	649.3
E-3	441.4	360.0	376.6	538.9	439.8	99.0
E-4	444.1	360.0	377.3	417.1	236.9	180.1
E-5	370.8	360.0	370.8	178.0	178.0	0.0
E-6	304.8	180.0	184.9	89.0	54.0	35.0
MOS = ASI		RECRUITS PER YEAR = 328.5				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	180.1	0.	0.	328.5	0.	328.5
E-2	111.3	0.	0.	235.6	0.	235.6
E-3	167.4	160.0	167.4	195.5	195.5	0.0
MOS = 27B		RECRUITS PER YEAR = 125.4				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	63.1	0.	0.	125.4	0.	125.4
E-2	65.3	0.	0.	104.2	0.	104.2
E-3	63.1	0.	0.	69.3	0.	69.3
E-4	117.7	60.0	62.2	77.2	40.8	36.4
E-5	67.5	65.0	67.5	44.3	44.3	0.0
MOS = 31E		RECRUITS PER YEAR = 116.5				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	59.2	0.	0.	116.5	0.	116.5
E-2	47.3	0.	0.	83.6	0.	83.6
E-3	55.3	0.	0.	67.7	0.	67.7
E-4	85.0	80.0	85.0	57.8	57.8	0.0
E-5	96.9	85.0	88.6	30.2	27.6	2.6

Table D2-1. (Con't.)

MOS = 52C		RECRUITS PER YEAR = 157.2		PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE									
E-1		92.3	0.		0.	0.	157.2	0.	157.2
E-2		55.2	0.		0.	0.	121.8	0.	121.8
E-3		88.7	85.0		85.0	88.7	105.7	105.7	0.0
E-4		178.0	15.0		15.0	15.5	86.2	7.5	78.7
MOS = 54E		RECRUITS PER YEAR = 15.1		PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE									
E-1		8.0	0.		0.	0.	15.1	0.	15.1
E-2		6.4	0.		0.	0.	12.4	0.	12.4
E-3		10.5	10.0		10.0	10.5	10.9	10.9	0.0
MOS = 63G		RECRUITS PER YEAR = 18.3		PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE									
E-1		9.9	0.		0.	0.	18.3	0.	18.3
E-2		7.4	0.		0.	0.	15.0	0.	15.0
E-3		10.5	10.0		10.0	10.5	12.3	12.2	0.0
MOS = 63H		RECRUITS PER YEAR = 341.6		PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE									
E-1		166.2	0.		0.	0.	341.6	0.	341.6
E-2		130.3	0.		0.	0.	289.3	0.	289.3
E-3		173.1	165.0		165.0	173.1	236.1	236.1	0.0
E-4		170.9	25.0		25.0	26.3	164.1	25.2	138.8

Table D2-1. (Con't.)

MOS = 53J		RECRUITS PER YEAR =	65.5				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	32.3	0.	0.	65.5	0.	65.5	
E-2	25.1	0.	0.	52.0	0.	52.0	
E-3	36.4	35.0	36.4	43.4	43.4	0.0	
E-4	85.5	10.0	10.3	34.2	4.1	30.1	
MOS = 63S		RECRUITS PER YEAR =	122.1				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	59.6	0.	0.	122.1	0.	122.1	
E-2	48.9	0.	0.	106.6	0.	106.6	
E-3	61.4	60.0	61.4	93.3	93.3	0.0	
E-4	102.7	20.0	20.7	66.5	13.4	53.1	
MOS = 63W		RECRUITS PER YEAR =	222.0				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	157.2	0.	0.	222.0	0.	222.0	
E-2	79.2	0.	0.	178.6	0.	178.6	
E-3	119.7	115.0	119.7	155.2	155.2	0.0	
E-4	171.6	35.0	36.4	118.8	25.2	93.6	
MOS = 63Y		RECRUITS PER YEAR =	189.1				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	93.6	0.	0.	189.1	0.	189.1	
E-2	68.0	0.	0.	160.3	0.	160.3	
E-3	103.0	100.0	103.0	144.2	144.2	0.0	
E-4	142.4	40.0	41.6	108.8	31.8	77.0	

Table D2-2. System: Wheel Reference.

MOS = 15XX		RECRUITS PER YEAR "		905.5			
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR.	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	496.4	0.	0.	905.5	0.	905.5	
E-2	306.9	0.	0.	649.3	0.	649.3	
E-3	461.4	180.0	188.3	538.9	219.9	319.0	
E-4	664.1	360.0	377.3	417.1	236.9	180.1	
E-5	370.8	360.0	370.8	178.0	178.0	0.0	
E-6	304.8	180.0	184.9	89.0	54.0	35.0	

MOS = AS1		RECRUITS PER YEAR =		307.9			
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR.	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	168.8	0.	0.	307.9	0.	307.9	
E-2	104.4	0.	0.	220.8	0.	220.8	
E-3	156.9	150.0	156.9	183.3	183.3	0.0	

MOS = 27B		RECRUITS PER YEAR =		96.5			
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR.	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	48.5	0.	0.	96.5	0.	96.5	
E-2	50.2	0.	0.	80.2	0.	80.2	
E-3	48.5	0.	0.	68.7	0.	68.7	
E-4	90.6	45.0	46.7	59.4	30.6	28.8	
E-5	51.9	50.0	51.9	34.0	34.0	0.0	

MOS = 31E		RECRUITS PER YEAR =		109.3			
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR.	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR	
E-1	55.5	0.	0.	109.3	0.	109.3	
E-2	44.3	0.	0.	78.4	0.	78.4	
E-3	51.9	0.	0.	63.5	0.	63.5	
E-4	79.7	75.0	79.6	54.2	54.2	0.0	
E-5	90.9	60.0	62.5	28.4	19.5	8.8	

Table D2-2. (Con't.)

MOS = 54E		RECRUITS PER YEAR = 15.1		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	8.0			0.		0.		15.1		0.		15.1	
E-2	6.4			0.		0.		12.4		0.		12.4	
E-3	10.5			10.0		10.5		10.9		10.9		0.0	

MOS = 63G		RECRUITS PER YEAR = 36.6		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	19.8			0.		0.		36.6		0.		36.6	
E-2	14.7			0.		0.		30.0		0.		30.0	
E-3	20.9			20.0		20.9		24.5		24.5		0.0	
E-4	24.0			5.0		5.2		18.8		4.1		14.7	

MOS = 63J		RECRUITS PER YEAR = 56.1		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	27.7			0.		0.		56.1		0.		56.1	
E-2	21.5			0.		0.		44.6		0.		44.6	
E-3	31.2			30.0		31.2		37.2		37.2		0.0	
E-4	73.3			5.0		5.2		29.3		2.1		27.3	

MOS = 63S		RECRUITS PER YEAR = 101.7		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	49.7			0.		0.		101.8		0.		101.8	
E-2	40.8			0.		0.		88.8		0.		88.8	
E-3	51.2			50.0		51.2		77.8		77.7		0.0	
E-4	85.6			20.0		20.7		55.4		13.4		42.0	

Table D2-2. (Con't.)

MOS = 63W		RECRUITS PER YEAR =	386.0							
<u>PAYGRADE</u>		<u>PERSONNEL REQUIREMENTS</u>	<u>UNADJUSTED MANPOWER</u>	<u>TTHS ADJUSTED MANPOWER</u>	<u>PERSONNEL TO BE TRAINED PER YR</u>	<u>MANPOWER LOSSES PER YR</u>	<u>OVERHEAD LOSSES PER YR</u>			
E-1		273.4	0.	0.	386.0	0.	386.0			
E-2		137.7	0.	0.	310.6	0.	310.6			
E-3		208.2	200.0	208.2	269.8	269.8	0.0			
E-4		298.5	50.0	51.9	206.5	35.9	170.6			

Table D2-3. System: I Lance.

MOS = 15XX		RECRUITS PER YEAR = 905.5		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE										
E-1		496.4		0.	0.	0.	0.	905.5	0.	905.5
E-2		306.9		0.	0.	0.	0.	649.3	0.	649.3
E-3		461.4		360.0	376.6	360.0	376.6	538.9	439.8	99.0
E-4		664.1		360.0	377.3	360.0	377.3	417.1	236.9	180.1
E-5		370.8		360.0	370.8	360.0	370.8	178.0	178.0	0.0
E-6		304.8		180.0	184.9	180.0	184.9	89.0	54.0	35.0

MOS = ASI		RECRUITS PER YEAR = 307.9		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE										
E-1		168.8		0.	0.	0.	0.	307.9	0.	307.9
E-2		104.4		0.	0.	0.	0.	220.8	0.	220.8
E-3		156.9		150.0	156.9	150.0	156.9	183.3	183.3	0.0

MOS = 27B		RECRUITS PER YEAR = 115.8		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE										
E-1		58.2		0.	0.	0.	0.	115.8	0.	115.8
E-2		60.3		0.	0.	0.	0.	96.2	0.	96.2
E-3		58.2		0.	0.	0.	0.	82.5	0.	82.5
E-4		108.7		55.0	57.0	55.0	57.0	71.3	37.4	33.9
E-5		62.3		60.0	62.3	60.0	62.3	40.9	40.9	0.0

MOS = 31E		RECRUITS PER YEAR = 43.8		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE										
E-1		22.3		0.	0.	0.	0.	43.8	0.	43.8
E-2		17.8		0.	0.	0.	0.	31.5	0.	31.5
E-3		20.8		0.	0.	0.	0.	25.5	0.	25.5
E-4		32.0		30.0	31.9	30.0	31.9	21.7	21.7	0.1
E-5		36.5		35.0	36.5	35.0	36.5	11.4	11.4	0.0

Table D2-3. (Con't.)

MOS = 31S		RECRUITS PER YEAR = 8.0		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE															
E-1		3.8		0.		0.		0.		8.0		0.		8.0	
E-2		4.4		0.		0.		0.		7.0		0.		7.0	
E-3		4.3		0.		0.		0.		5.5		0.		5.5	
E-4		5.6		5.0		5.6		5.6		4.6		4.6		0.0	
MOS = 31V		RECRUITS PER YEAR = 91.5		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE															
E-1		53.8		0.		0.		0.		91.5		0.		91.5	
E-2		33.7		0.		0.		0.		68.5		0.		68.5	
E-3		53.5		50.0		53.5		53.5		59.7		59.7		0.0	
MOS = 35E		RECRUITS PER YEAR = 25.2		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE															
E-1		14.2		0.		0.		0.		25.3		0.		25.3	
E-2		9.8		0.		0.		0.		20.7		0.		20.7	
E-3		15.7		15.0		15.7		15.7		19.2		19.2		0.0	
MOS = 35H		RECRUITS PER YEAR = 7.1		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE															
E-1		3.6		0.		0.		0.		7.1		0.		7.1	
E-2		3.4		0.		0.		0.		6.1		0.		6.1	
E-3		4.1		0.		0.		0.		5.2		0.		5.2	
E-4		5.6		5.0		5.6		5.6		4.3		4.3		0.0	

Table D2-3. (Con't.)

MOS = 52C	RECRUITS PER YEAR =	184.9										
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR						
E-1	108.5	0.	0.	185.0	0.	185.0						
E-2	64.9	0.	0.	143.3	0.	143.3						
E-3	104.3	100.0	104.3	124.3	124.3	0.0						
E-4	209.5	15.0	15.5	101.4	7.5	93.9						
MOS = 54E	RECRUITS PER YEAR =	15.1										
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR						
E-1	8.0	0.	0.	15.1	0.	15.1						
E-2	6.4	0.	0.	12.4	0.	12.4						
E-3	10.5	10.0	10.5	10.9	10.9	0.0						
MOS = 63G	RECRUITS PER YEAR =	9.1										
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR						
E-1	5.0	0.	0.	9.2	0.	9.2						
E-2	3.7	0.	0.	7.5	0.	7.5						
E-3	5.2	5.0	5.2	6.1	6.1	0.0						
MOS = 63H	RECRUITS PER YEAR =	186.3										
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR						
E-1	90.6	0.	0.	186.3	0.	186.3						
E-2	71.1	0.	0.	158.1	0.	158.1						
E-3	94.4	90.0	94.4	128.8	128.8	0.0						
E-4	93.2	15.0	15.8	89.5	15.1	74.4						

Table D2-3. (Con't.)

MOS = 63J		RECRUITS PER YEAR =		121.6									
<u>PAYGRADE</u>		<u>PERSONNEL REQUIREMENTS</u>		<u>UNADJUSTED MANPOWER</u>		<u>TTHS ADJUSTED MANPOWER</u>		<u>PERSONNEL TO BE TRAINED PER YR</u>		<u>MANPOWER LOSSES PER YR</u>		<u>OVERHEAD LOSSES PER YR</u>	
E-1		60.1		0.		0.		121.6		0.		121.6	
E-2		46.5		0.		0.		96.6		0.		96.6	
E-3		67.6		65.0		67.6		80.6		30.6		0.0	
E-4		158.8		10.0		10.3		63.5		4.1		59.4	

MOS = 63S		RECRUITS PER YEAR = 81.4							
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	39.7	0.	0.	81.4	0.	81.4			
E-2	32.6	0.	0.	71.1	0.	71.1			
E-3	40.9	40.0	40.9	62.2	62.2	0.0			
E-4	68.4	20.0	20.7	44.4	13.4	30.9			

MOS = 63W		RECRUITS PER YEAR = 231.6							
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	164.0	0.	0.	231.6	0.	231.6			
E-2	82.6	0.	0.	186.4	0.	186.4			
E-3	124.9	120.0	124.9	161.9	161.9	0.0			
E-4	179.1	35.0	36.4	123.9	25.2	98.8			

MOS = 63Y		RECRUITS PER YEAR = 94.5							
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	44.8	0.	0.	94.5	0.	94.5			
E-2	34.0	0.	0.	80.1	0.	80.1			
E-3	51.5	50.0	51.5	72.1	72.1	0.0			
E-4	71.2	10.0	10.4	54.4	7.9	46.4			

Table D2-4. System: MLIS.

MOS = 15XX		RECRUITS PER YEAR = 905.5				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	496.4	0.	0.	905.5	0.	905.5
E-2	303.9	0.	0.	649.3	0.	649.3
E-3	461.4	180.0	188.3	538.9	219.9	319.0
E-4	664.1	360.0	377.3	417.1	236.9	180.1
E-5	370.8	360.0	370.8	178.0	178.0	0.0
E-6	304.8	180.0	184.9	89.0	54.0	35.0
E-7	144.6	0.	0.	45.1	0.	45.1
E-8	8.6	0.	0.	21.4	0.	21.4
E-9	0.0	0.	0.	0.	0.	0.

MOS = AS1		RECRUITS PER YEAR = 205.3				
<u>PAYGRADE</u>	<u>PERSONNEL REQUIREMENTS</u>	<u>UNADJUSTED MANPOWER</u>	<u>TTHS ADJUSTED MANPOWER</u>	<u>PERSONNEL TO BE TRAINED PER YR</u>	<u>MANPOWER LOSSES PER YR</u>	<u>OVERHEAD LOSSES PER YR</u>
E-1	112.6	0.	0.	205.3	0.	205.3
E-2	69.5	0.	0.	147.2	0.	147.2
E-3	104.6	100.0	104.6	122.2	122.2	0.0

MOS = 27B		RECRUITS PER YEAR = 57.9				
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER..	TTHS ADJUSTED MANPOWER.....	PERSONNEL TO BE TRAINED PER YR..	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
E-1	29.1	0.	0.	57.9	0.	57.9
E-2	30.1	0.	0.	48.1	0.	48.1
E-3	29.1	0.	0.	41.2	0.	41.2
E-4	54.3	25.0	25.9	35.6	17.0	18.6
E-5	31.1	30.0	31.1	20.4	20.4	0.0

MOS = 71E		RECRUITS PER YEAR = 37.6				
<u>PAYGRADE</u>	<u>PERSONNEL REQUIREMENTS</u>	<u>UNADJUSTED MANPOWER</u>	<u>TTHS ADJUSTED MANPOWER</u>	<u>PERSONNEL TO BE TRAINED PER YR.</u>	<u>MANPOWER LOSSES PER YR</u>	<u>OVERHEAD LOSSES PER YR</u>
E-1	19.1	0.	0.	37.6	0.	37.6
E-2	15.3	0.	0.	27.0	0.	27.0
E-3	17.9	0.	0.	21.9	0.	21.9
E-4	27.4	25.0	26.5	18.6	18.1	0.6
E-5	31.1	30.0	31.7	9.8	9.8	0.0

Table D2-4. (Con't.)

MOS = 31S		RECRUITS PER YEAR =		8.0	UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS												
E-1		3.8			0.		0.		8.0		0.		0.0	
E-2		4.4			0.		0.		7.0		0.		7.0	
E-3		4.3			0.		0.		5.5		0.		5.5	
E-4		5.5			5.0		5.6		4.6		4.6		0.0	

MOS = 31V		RECRUITS PER YEAR =		91.5	UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS												
E-1		53.8			0.		0.		91.5		0.		91.5	
E-2		33.7			0.		0.		68.5		0.		68.5	
E-3		53.5			50.0		53.5		59.7		59.7		0.0	

MOS = 35E		RECRUITS PER YEAR =		25.2	UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS												
E-1		14.2			0.		0.		25.3		0.		25.3	
E-2		9.8			0.		0.		20.7		0.		20.7	
E-3		15.7			15.0		15.7		19.2		19.2		0.0	

MOS = 35H		RECRUITS PER YEAR =		7.1	UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS												
E-1		3.6			0.		0.		7.1		0.		7.1	
E-2		3.4			0.		0.		6.1		0.		6.1	
E-3		4.1			0.		0.		5.2		0.		5.2	
E-4		5.6			5.0		5.6		4.3		4.3		0.0	

Table D2-4. (Con't.)

MOS = 52C		RECRUITS PER YEAR = 74.0		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR	
E-1		43.4		0.		0.		74.0		74.0	
E-2		26.6		0.		0.		57.3		57.3	
E-3		41.7		40.0		41.7		49.7		0.0	
E-4		83.8		15.0		15.5		40.6		33.1	
MOS = 54E		RECRUITS PER YEAR = 15.1		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR	
E-1		8.0		0.		0.		15.1		15.1	
E-2		6.4		0.		0.		12.4		12.4	
E-3		10.5		10.0		10.5		10.9		0.0	
MOS = 63G		RECRUITS PER YEAR = 9.1		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR	
E-1		5.0		0.		0.		9.2		9.2	
E-2		3.7		0.		0.		7.5		7.5	
E-3		5.2		5.0		5.2		6.1		0.0	
MOS = 63H		RECRUITS PER YEAR = 113.9		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE		PERSONNEL REQUIREMENTS		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR	
E-1		55.4		0.		0.		113.9		113.9	
E-2		43.4		0.		0.		96.6		96.6	
E-3		57.7		0.		57.7		78.7		0.0	
E-4		57.0		0.		10.5		54.7		44.6	

Table D2-4. (Con't.)

MOS = 63J		RECRUITS PER YEAR = 65.5		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER									
E-1	32.3	0.		0.		65.5		0.		65.5	
E-2	25.1	0.		0.		52.0		0.		52.0	
E-3	36.4	35.0		36.4		43.4		43.4		0.0	
E-4	85.5	10.0		10.3		34.2		4.1		30.1	
MOS = 63S		RECRUITS PER YEAR = 101.7		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER									
E-1	49.7	0.		0.		101.8		0.		101.8	
E-2	40.8	0.		0.		88.8		0.		88.8	
E-3	51.2	50.0		51.2		77.8		77.7		0.0	
E-4	85.6	20.0		20.7		55.4		13.4		42.0	
MOS = 63W		RECRUITS PER YEAR = 183.3		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER									
E-1	129.9	0.		0.		183.4		0.		183.4	
E-2	65.4	0.		0.		147.5		0.		147.5	
E-3	98.9	95.0		98.9		128.2		128.2		0.0	
E-4	141.8	15.0		15.6		98.1		10.8		87.3	
MOS = 63Y		RECRUITS PER YEAR = 37.8		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER									
E-1	18.7	0.		0.		37.8		0.		37.8	
E-2	13.6	0.		0.		32.1		0.		32.1	
E-3	20.6	20.0		20.6		28.8		28.8		0.0	
E-4	28.5	10.0		10.4		21.8		7.9		13.8	

Table D2-5. System: Lance II.

MUS - 15XX		RECRUITS PER YEAR = 705.5		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	496.4	0.	0.	705.5	0.	705.5			
E-2	306.9	0.	0.	649.3	0.	649.3			
E-3	461.4	180.0	188.3	538.9	219.9	319.0			
E-4	664.1	360.0	377.3	417.1	236.9	180.1			
E-5	370.8	360.0	370.8	178.0	178.0	0.0			
E-6	304.8	100.0	184.9	89.0	54.0	25.0			
MUS - AS1		RECRUITS PER YEAR = 246.3		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	133.1	0.	0.	246.4	0.	246.4			
E-2	83.5	0.	0.	176.7	0.	176.7			
E-3	125.5	120.0	125.5	146.6	146.6	0.0			
MUS - 27B		RECRUITS PER YEAR = 96.5		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	48.5	0.	0.	96.5	0.	96.5			
E-2	50.2	0.	0.	80.2	0.	80.2			
E-3	48.5	0.	0.	68.7	0.	68.7			
E-4	90.6	50.0	51.8	59.4	34.0	25.4			
E-5	51.9	50.0	51.9	34.0	34.0	0.0			
MUS - 31E		RECRUITS PER YEAR = 43.8		PERSONNEL TO BE TRAINED PER YR		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR			
E-1	22.3	0.	0.	43.8	0.	43.8			
E-2	17.8	0.	0.	31.5	0.	31.5			
E-3	20.8	0.	0.	25.5	0.	25.5			
E-4	32.0	20.0	31.9	21.7	21.7	0.1			
E-5	46.5	25.0	36.5	11.4	11.4	0.0			

Table D2-5. System: Lance II.

MUS - 15XX		RECRUITS PER YEAR = 405.5		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	476.4	0.		0.		0.		905.5		0.		405.5	
E-2	306.9	0.		0.		0.		649.3		0.		649.3	
E-3	461.4	180.0		188.3		188.3		539.9		219.9		319.0	
E-4	664.1	360.0		377.3		377.3		417.1		236.9		180.1	
E-5	370.8	360.0		370.8		370.8		178.0		178.0		0.0	
E-6	304.8	180.0		184.9		184.9		89.0		54.0		35.0	

MUS - AS1		RECRUITS PER YEAR = 246.3		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	135.1	0.		0.		0.		246.4		0.		246.4	
E-2	83.5	0.		0.		0.		176.7		0.		176.7	
E-3	125.5	120.0		125.5		125.5		146.6		146.6		0.0	

MUS - 27B		RECRUITS PER YEAR = 96.5		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	48.5	0.		0.		0.		96.5		0.		96.5	
E-2	50.2	0.		0.		0.		80.2		0.		80.2	
E-3	48.5	0.		0.		0.		68.7		0.		68.7	
E-4	90.6	50.0		51.8		51.8		59.4		34.0		25.4	
E-5	51.4	50.0		51.9		51.9		34.0		34.0		0.0	

MUS - 31E		RECRUITS PER YEAR = 43.8		UNADJUSTED MANPOWER		TTHS ADJUSTED MANPOWER		PERSONNEL TO BE TRAINED PER YR.		MANPOWER LOSSES PER YR		OVERHEAD LOSSES PER YR	
PAYGRADE	PERSONNEL REQUIREMENTS												
E-1	22.3	0.		0.		0.		43.8		0.		43.8	
E-2	17.8	0.		0.		0.		31.5		0.		31.5	
E-3	20.8	0.		0.		0.		25.5		0.		25.5	
E-4	32.0	20.0		21.7		21.7		21.7		21.7		0.1	
E-5	40.5	30.0		36.5		36.5		11.4		11.4		0.0	

Table D2-5. (Con't.)

MOS = 315		RECRUITS PER YEAR = 8.0		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	THS ADJUSTED MANPOWER				
E-1	3.8	0.	0.	8.0	0.	8.0	
E-2	4.4	0.	0.	7.0	0.	7.0	
E-3	4.3	0.	0.	5.5	0.	5.5	
E-4	5.6	5.0	5.6	4.6	4.6	0.0	

MOS = 316		RECRUITS PER YEAR = 91.5		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	THS ADJUSTED MANPOWER				
E-1	53.8	0.	0.	91.5	0.	91.5	
E-2	33.7	0.	0.	68.5	0.	68.5	
E-3	53.5	50.0	53.5	59.7	59.7	0.0	

MOS = 356		RECRUITS PER YEAR = 25.2		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	THS ADJUSTED MANPOWER				
E-1	14.2	0.	0.	25.3	0.	25.3	
E-2	9.8	0.	0.	20.7	0.	20.7	
E-3	15.7	15.0	15.7	19.2	19.2	0.0	

MOS = 358		RECRUITS PER YEAR = 7.1		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER	THS ADJUSTED MANPOWER				
E-1	3.6	0.	0.	7.1	0.	7.1	
E-2	3.4	0.	0.	6.1	0.	6.1	
E-3	4.1	0.	0.	5.2	0.	5.2	
E-4	5.6	5.0	5.6	4.3	4.3	0.0	

Table D2-5. (Con't.)

MUS - 54C		RECRUITS PER YEAR =		111.0		TTHS ADJUSTED		PERSONNEL TO BE		MANPOWER		OVERHEAD	
PAYGRADE	REQUIREMENTS	UNADJUSTED	MANPOWER	MANPOWER	MANPOWER	PERSONNEL TO BE	TRAINED PER YR	MANPOWER	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR
E-1	65.1	0.	0.	0.	0.	111.0	0.	0.	0.	111.0	0.	0.	0.
E-2	38.9	0.	0.	0.	0.	36.0	0.	0.	0.	36.0	0.	0.	0.
E-3	62.6	60.0	60.0	62.6	62.6	74.6	62.6	74.6	74.6	74.6	74.6	74.6	74.6
E-4	125.7	15.0	15.0	15.5	15.5	60.8	60.8	7.5	7.5	53.3	53.3	53.3	53.3
MUS - 54E		RECRUITS PER YEAR =		15.1		TTHS ADJUSTED		PERSONNEL TO BE		MANPOWER		OVERHEAD	
PAYGRADE	REQUIREMENTS	UNADJUSTED	MANPOWER	MANPOWER	MANPOWER	PERSONNEL TO BE	TRAINED PER YR	MANPOWER	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR
E-1	8.0	0.	0.	0.	0.	15.1	0.	0.	0.	15.1	0.	0.	0.
E-2	6.4	0.	0.	0.	0.	12.4	0.	0.	0.	12.4	0.	0.	0.
E-3	10.5	10.0	10.0	10.5	10.5	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
MUS - 63C		RECRUITS PER YEAR =		18.3		TTHS ADJUSTED		PERSONNEL TO BE		MANPOWER		OVERHEAD	
PAYGRADE	REQUIREMENTS	UNADJUSTED	MANPOWER	MANPOWER	MANPOWER	PERSONNEL TO BE	TRAINED PER YR	MANPOWER	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR
E-1	9.9	0.	0.	0.	0.	18.3	0.	0.	0.	18.3	0.	0.	0.
E-2	7.4	0.	0.	0.	0.	15.0	0.	0.	0.	15.0	0.	0.	0.
E-3	10.5	10.0	10.0	10.5	10.5	12.3	12.3	12.2	12.2	0.0	0.0	0.0	0.0
MUS - 63J		RECRUITS PER YEAR =		93.5		TTHS ADJUSTED		PERSONNEL TO BE		MANPOWER		OVERHEAD	
PAYGRADE	REQUIREMENTS	UNADJUSTED	MANPOWER	MANPOWER	MANPOWER	PERSONNEL TO BE	TRAINED PER YR	MANPOWER	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR	LOSSES PER YR
E-1	46.2	0.	0.	0.	0.	93.5	0.	0.	0.	93.5	0.	0.	0.
E-2	35.8	0.	0.	0.	0.	74.3	0.	0.	0.	74.3	0.	0.	0.
E-3	52.0	50.0	50.0	52.0	52.0	62.0	62.0	62.0	62.0	0.0	0.0	0.0	0.0
E-4	122.2	10.0	10.0	10.3	10.3	40.9	40.9	4.1	4.1	44.7	44.7	44.7	44.7

Table D2-5. (Con't.)

MOS - 635		RECRUITS PER YEAR = 203.5		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER					
E-1	99.4	0.	0.	203.5	0.	203.5	
E-2	81.5	0.	0.	177.7	0.	177.7	
E-3	102.3	100.0	102.3	155.5	155.5	0.0	
E-4	171.1	40.0	41.4	110.9	26.8	84.1	

MOS - 63W		RECRUITS PER YEAR = 270.2		TTHS ADJUSTED MANPOWER	PERSONNEL TO BE TRAINED PER YR	MANPOWER LOSSES PER YR	OVERHEAD LOSSES PER YR
PAYGRADE	PERSONNEL REQUIREMENTS	UNADJUSTED MANPOWER					
E-1	191.4	0.	0.	270.2	0.	270.2	
E-2	96.4	0.	0.	217.4	0.	217.4	
E-3	145.7	140.0	145.7	188.9	188.9	0.0	
E-4	208.9	40.0	41.6	144.6	28.8	115.8	

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APPENDIX E
IMPACT ANALYSIS

Appendix E1 contains the Availability Ratio (AR) results categorized by system, MOS and paygrade. Section 7 displayed the results in summary form (MOS totals) and indicated the percentage change in availability CSWS placed upon MOS manpower. This section indicates shortfalls or surpluses by MOS/paygrade within each CSWS system but does not indicate percentage changes by MOS/paygrades between Current FY-83 Availability Ratios (Table E1-3) and CSWS Availability Ratios (Table E1-4 to Table E1-7.).

Appendix E2 Personnel Management Impacts contains the "Impact of High Technology Systems on the Army Personnel Management System" by Paul D. Phillips, Brigadier General (U.S. Army - retired). This paper focuses on the concept that incoming personnel are decreasing in quantities and skill while system technology is increasing. It is an inverse function which must be investigated in detail. To have an effective Army, the right face must be in the right place.

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APPENDIX E1
PERSONNEL RESOURCE IMPACTS

Table E1-1. Adjusted Availability FY 1983 Projection.

GRADE	1-3	4	5	6	7	8	9
MOS							
150X	1060.290	954.954	354.144	233.240	136.220	0.000	0.000
27B	123.790	109.732	39.442	50.123	104.000	0.000	0.000
31C	465.771	360.192	546.060	239.000	0.000	0.000	0.000
31B	131.360	106.362	194.910	115.000	60.264	0.000	0.000
31U	1502.360	1299.210	565.614	2064.004	1017.110	179.930	0.000
35E	341.152	153.934	14.424	74.340	0.000	0.000	0.000
35H	70.808	187.765	255.200	219.952	37.724	22.379	0.000
52C	168.017	495.723	251.940	129.010	0.000	0.000	0.000
54E	1603.284	715.904	1850.030	1114.163	452.556	0.000	0.000
63G	240.975	338.070	216.104	0.000	0.000	0.000	0.000
63H	1663.680	1621.455	1029.523	1001.703	767.039	0.000	0.000
63J	367.650	393.600	293.003	63.600	0.000	0.000	0.000
63S	567.629	372.237	331.960	0.000	0.000	0.000	0.000
63W	1870.064	913.327	641.943	0.000	0.000	0.000	0.000
63Y	745.322	565.510	363.040	0.000	0.000	0.000	0.000

Table E1-2. Adjusted Authorizations FY 1983 Projections.

GRADE	1-3	4	5	6	7	8	9
MOS							
150X	967.510	937.732	257.040	300.700	146.923	0.000	0.000
27B	140.230	79.929	63.302	64.503	83.000	0.000	0.000
31E	503.968	231.686	463.672	345.000	0.000	0.000	0.000
31B	215.923	101.382	154.060	97.813	34.992	0.000	0.000
31U	1324.300	1414.530	422.100	2037.236	791.300	226.333	0.000
35E	111.156	209.440	146.172	33.055	0.000	0.000	0.000
35H	131.470	91.036	134.300	207.036	129.176	40.866	0.000
52C	508.539	669.900	271.320	83.420	0.000	0.000	0.000
54E	1290.540	621.656	2444.704	1122.030	626.616	0.000	0.000
63G	244.755	350.485	153.364	0.000	0.000	0.000	0.000
63H	1799.192	1383.705	732.100	1036.513	392.769	0.000	0.000
63J	241.300	431.040	130.545	73.500	0.000	0.000	0.000
63S	356.923	300.916	579.000	0.000	0.000	0.000	0.000
63W	1103.687	799.806	521.323	0.000	0.000	0.000	0.000
63Y	523.200	454.930	331.120	0.000	0.000	0.000	0.000

Table E1-3. Availability Ratio.
MOS/Paygrade Detail

SYSTEM: CURRENT FY 83 PROJECTION

	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	1.22	1.02	1.38	0.94	0.93	1.00	1.00
27B	0.92	1.37	0.58	0.78	1.25	1.00	1.00
31E	0.83	1.55	1.18	0.69	1.00	1.00	1.00
31S	0.61	1.05	1.26	1.18	1.72	1.00	1.00
31V	1.13	0.92	1.34	1.01	1.29	0.79	1.00
35E	2.17	0.76	0.97	1.95	1.00	1.00	1.00
35H	1.10	2.06	1.38	1.06	0.68	0.55	1.00
52C	1.51	0.74	0.93	1.55	1.00	1.00	1.00
54E	1.24	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.98	0.96	1.36	1.00	1.00	1.00	1.00
63H	0.92	1.17	1.32	0.97	0.86	1.00	1.00
63J	1.52	0.91	2.29	0.93	1.00	1.00	1.00
63S	1.59	1.24	0.57	1.00	1.00	1.00	1.00
63W	0.98	1.14	1.23	1.00	1.00	1.00	1.00
63Y	1.43	1.24	0.95	1.00	1.00	1.00	1.00

Table E1-4. Availability Ratio.

MOS/Paygrade Detail

SYSTEM:	TRACK REFERENCE						
	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	0.76	0.74	0.57	0.59	0.93	1.00	1.00
27B	0.92	0.78	0.30	0.78	1.25	1.00	1.00
31E	0.83	1.16	1.00	0.69	1.00	1.00	1.00
31S	0.61	1.00	1.26	1.18	1.72	1.00	1.00
31V	1.04	.92	1.34	1.01	1.29	0.79	1.00
35E	1.04	0.69	0.97	1.95	1.00	1.00	1.00
35H	1.10	1.95	1.38	1.05	0.68	0.55	1.00
52C	1.29	0.72	0.93	1.55	1.00	1.00	1.00
54E	1.23	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.95	0.96	1.36	1.00	1.00	1.00	1.00
63H	0.85	1.15	1.32	0.97	0.86	1.00	1.00
63J	1.33	0.89	2.29	0.93	1.00	1.00	1.00
63S	1.36	1.16	0.57	1.00	1.00	1.00	1.00
63W	0.88	1.10	1.23	1.00	1.00	1.00	1.00
63Y	1.20	1.14	0.95	1.00	1.00	1.00	1.00

Table E1-5. Availability Ratio.

MOS/Paygrade Detail

SYSTEM: WHEEL REFERENCE

	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	0.89	0.74	0.57	0.59	0.93	1.00	1.00
27I	0.92	0.88	0.33	0.78	1.25	1.00	1.00
31E	0.83	1.17	1.04	0.69	1.00	1.00	1.00
31S	0.61	1.00	1.26	1.18	1.72	1.00	1.00
31V	1.04	0.92	1.34	1.01	1.29	0.80	1.00
35E	1.30	0.69	0.97	1.95	1.00	1.00	1.00
35H	1.10	1.95	1.38	1.06	0.68	0.55	1.00
52C	1.39	0.72	0.93	1.55	1.00	1.00	1.00
54E	1.23	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.91	0.95	1.36	1.00	1.00	1.00	1.00
63H	0.93	1.17	1.32	0.97	1.00	1.00	1.00
63J	1.36	0.90	2.29	0.93	1.00	1.00	1.00
63S	1.40	1.16	0.57	1.00	1.00	1.00	1.00
63W	0.83	1.08	1.23	1.00	1.00	1.00	1.00
63Y	1.43	1.24	0.95	1.00	1.00	1.00	1.00

Table El-6. Availability Ratio.

MOS/Paygrade Detail

SYSTEM: I LANCE

	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	0.77	0.74	0.57	0.59	0.93	1.00	1.00
27B	0.92	0.81	0.31	0.78	1.25	1.00	1.00
31E	0.83	1.38	1.10	0.69	1.00	1.00	1.00
31S	0.61	1.00	1.26	1.18	1.72	1.00	1.00
31V	1.09	0.92	1.34	1.01	1.29	0.79	1.00
35E	1.91	0.76	0.97	1.95	1.00	1.00	1.00
35H	1.10	1.95	1.38	1.06	0.68	0.55	1.00
52C	1.26	0.72	0.93	1.55	1.00	1.00	1.00
54E	1.23	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.97	0.97	1.36	1.00	1.00	1.00	1.00
63H	0.88	1.16	1.32	0.97	0.86	1.00	1.00
63J	1.20	0.89	2.29	0.93	1.00	1.00	1.00
63S	1.43	1.16	0.57	1.00	1.00	1.00	1.00
63W	0.88	1.10	1.23	1.00	1.00	1.00	1.00
63Y	1.30	1.22	0.96	1.00	1.00	1.00	1.00

Table E1-7. Availability Ratio.

MOS/Paygrade Detail

SYSTEM: MLIS

	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	0.92	0.74	0.57	0.59	0.93	1.00	1.00
27B	0.92	1.04	0.40	0.78	1.25	1.00	1.00
31E	0.83	1.40	1.11	0.69	1.00	1.00	1.00
31S	0.61	1.00	1.26	1.18	1.72	1.00	1.00
31V	1.09	0.92	1.34	1.01	1.28	0.79	1.00
35E	1.91	0.76	0.97	1.95	1.00	1.00	1.00
35H	1.09	1.95	1.38	1.05	0.68	0.55	1.00
52C	1.40	0.72	0.93	1.55	1.00	1.00	1.00
54E	1.23	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.97	0.97	1.36	1.00	1.00	1.00	1.00
63H	0.90	1.16	1.32	0.97	0.86	1.00	1.00
63J	1.33	0.89	2.29	0.93	1.00	1.00	1.00
63S	1.40	1.16	0.57	1.00	1.00	1.00	1.00
63W	0.86	1.11	1.23	1.00	1.00	1.00	1.00
63Y	1.37	1.22	0.95	1.00	1.00	1.00	1.00

Table E1-8. Availability Ratio.

MOS/Paygrade Detail

SYSTEM: LANCE II

	<u>E1-3</u>	<u>E-4</u>	<u>E-5</u>	<u>E-6</u>	<u>E-7</u>	<u>E-8</u>	<u>E-9</u>
15X	0.91	0.74	0.57	0.60	0.93	1.00	1.00
27B	0.92	0.85	0.33	0.78	1.25	1.00	1.00
31E	0.83	1.38	1.10	0.69	1.00	1.00	1.00
31S	0.61	1.00	1.26	1.18	1.72	1.00	1.00
31V	1.09	.92	1.34	1.01	1.29	0.80	1.00
35E	1.91	0.76	0.97	1.95	1.00	1.00	1.00
35H	1.10	1.95	1.38	1.06	0.68	0.55	1.00
52C	1.35	0.72	0.93	1.55	1.00	1.00	1.00
54E	1.23	1.15	0.76	0.99	0.72	1.00	1.00
63G	0.95	0.97	1.36	1.00	1.00	1.00	1.00
63H	0.93	1.17	1.32	0.97	0.86	1.00	1.00
63J	1.33	0.90	2.29	0.93	1.00	1.00	1.00
63S	1.24	1.09	0.57	1.00	1.00	1.00	1.00
63W	0.87	1.09	1.23	1.00	1.00	1.00	1.00
63Y	1.43	1.24	0.96	1.00	1.00	1.00	1.00

APPENDIX E2
PERSONNEL MANAGEMENT IMPACTS

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IMPACT OF HIGH TECHNOLOGY SYSTEMS
ON THE
ARMY PERSONNEL MANAGEMENT SYSTEM

April, 1982

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IMPACT OF HIGH TECHNOLOGY SYSTEMS ON THE ARMY
PERSONNEL MANAGEMENT SYSTEM

EXECUTIVE SUMMARY

From the assessment that follows, one can make the following conclusions as more system specific MOS for low density, high technology systems are added.

1. The mission of the personnel management system of putting the right face at the right place at the right time will be more complex, estimates will be more difficult to make and errors are likely to be more frequent and slower to be corrected because there will be a larger number of smaller MOS cells to be managed.
2. For the same number of force structure spaces, the Army will need increased end strength and many years to cover more, smaller, longer and more difficult training courses and higher attrition in those courses. For the same reasons, the Army will need more recruits each year. In a typical case, the

increase would be an 11 percent increase in recruits and a 20 percent increase in trainee end strength and manyears in converting a typical combat MOS (11B) to a typical higher skill MOS (31S), "Field General Communication Security Repairer". Corresponding increases would be in the recruiting force and in the training force.

3. To reduce training attrition, the Army will need more and a higher proportion of the brighter population than it has been getting and this will require more and higher enlistment bonuses.
4. The career force will be more difficult and more costly to maintain since technologically trained soldiers in both the first term and career force will be in demand in civil life and reenlistment rates will be relatively low, requiring high reenlistment bonus payments.
- 5a. Because the high technology weapon systems are very costly compared to the systems being replaced, the phase-in will be gradual - especially to the Reserve Components - forcing the Army to train soldiers on two quite different

equipments, using two quite different sets of training programs and trainees over the phase-in period. In event of mobilization, such soldiers will not be interchangeable on equipment designed for the same mission; field artillery fire control equipment is an excellent example for both operators and repairers.

5b. For the same reason, unless the new systems are issued in a balanced way between CONUS and overseas locations, many MOSs will become imbalanced, seriously complicating the CONUS - overseas rotation problem and forcing soldiers to spend a disproportionate time overseas, further reducing reenlistment rates. But, unless the new systems replace the old in a given theater very quickly, the personnel management problem is complicated - as in 5a - in that theater; there is a loss of flexibility in personnel assignment on systems designed for the same mission.

6. Because of increases in strength, many years, training and recruiting overhead, and increased bonuses, the Army will cost more for the same number of force structure spaces.

7. To provide reasonable promotion opportunity in the larger number of smaller MOS cells, it will be necessary to increase the richness of the mix of the higher enlisted grades to the lower enlisted grades and within the higher grades for the Army as a whole.

IMPACT OF HIGH TECHNOLOGY SYSTEMS ON THE
ARMY PERSONNEL MANAGEMENT SYSTEM

Purpose: To assess the impact on the Army personnel management system of large numbers of system-specific MOS for low density, high technology systems, such as the Corps Support Weapon System.

Scope: We will -

- First, outline in broad terms, the Army personnel management system.
- Second, list the set of changes that will come about by having large numbers of low density, high technology MOS.
- Third, estimate the effect of the more important changes on the personnel management system, quantifying the effect when possible.

ARMY PERSONNEL MANAGEMENT SYSTEM

BROAD OUTLINE

- Mission. To put the right face in the right place at the right time, in peace or war.
- Implications. The right face means all of the following: right training, right grade, right skill.

The right place means in an authorized space.

The right time means filling a space that is not already filled and that has remained unfilled for a minimum time, preferably one day.

- Size of Problem; Complexity of Problem.

Size of the Army. The Congress fixes the size of the Army each year through the authorization and appropriations process. The Congress dictates both the manpower end strength and, by specifying the dollars authorized, the manyears or average strength authorized throughout the year.

Theoretically, this size represents a roll-up of the spaces in all of the units in the Army force structure plus an allowance for trainees, transients, holdees (people awaiting discharge, in the hospital, in prison), and students (TTHS).

Recently authorized Army end strength breaks out about as follows:¹

TOTAL	774,000		
OFFICERS	(94,000)		
ENLISTED	(660,000)		
		NR	%
FORCE STRUCTURE SPACES	670,000		86.6
INDIVIDUALS (TTHS)	104,000		13.4
TOTALS	774,000		100.0

TABLE 1

¹ FY83 budget request is for 783,800; 104,707 officers, 674,676 EM, and 4417 cadets.

The problem for the personnel management system is to fill the 670,00 force structure spaces and to keep them filled.

Since the Army always wants a larger force structure than it can afford to man fully, it is willing to man some units at less than full wartime strength and readiness, using the spaces thus freed up to create additional units. The process of determining precisely what spaces in units are to be filled is accomplished through the Army Authorization Document System by the major Army field commanders, each of whom is allotted a portion of the congressional authorized spaces. The end result is the target for the personnel management system, that is, to fill the authorized spaces with people.

Each such space is designated by skill (Military Occupational Specialty) and grade.

o Fill Complexities.

There are about 680,000 enlisted spaces authorized for the active Army of which about half are first term soldiers, (generally E-1 to E-4) and about half are careerists

(generally E-4 to E-9), a careerist being a soldier who has reenlisted at least once.

There are about 360 MOS, making the average cell size (ignoring grade) 1889. But the actual cell size varies widely, from 41 basson players (MOS 02K) to about 56,000 infantry men (MOS 11B). If we consider grade and assume that the average cell has a grade distribution like the Army as a whole, the personnel management problem is complicated by even smaller cells, as shown below.

Table 2. Grade Cells For An "Average" MOS Cell MOS "X" Total Strength 1889.

GRADE	%	NUMBER
E1-3	33	623
E1-4	27	510
E1-5	18	340
E1-6	12	227
E1-7	7	132
E1-8	2	38
E1-9	<1	19
TOTAL	100	1889

The fill problem is further complicated by the fact that over 40% of the Army is overseas and some of the spaces are authorized to be filled by women, on the average, 8%. Taking these factors into account, we have even smaller cells to deal with, viz;

Table 3. MOS "X" Total Strength 1889.

	CONUS (60%) 1133		OVERSEAS (40%) 756	
	MALE (1042)	FEMALE (91)	MALE (696)	FEMALE (60)
E1-3	344	30	230	20
E1-4	281	25	188	16
E1-5	188	17	125	11
E1-6	125	11	84	7
E1-7	73	6	49	4
E1-8	21	2	14	1
E1-9	10	1	7	1
TOTALS*	1042	92	697	60

*TOTALS DO NOT ADD DUE TO ROUNDING

As can be seen, the E-1/E-3 cell of 623 has become 4 management cells varying in size from 20 to 344. And the total number of management cells has increased from 7 to 27 (28 counting the 0 cell) varying in size from 1 to 344.

It is true that not all of the about 360 3 digit alpha-numeric MOSs contain all 9 grades (some being "feeder" MOS to "capper" MOS) and that not all MOS are open to women (but over 90% are). Offsetting this reduction in cells to be managed are a number of skill identifiers for the 360 MOSs which increase the number of cells. So we can roughly estimate the cells to be managed at about

$$360 \times 7 \text{ grade cells} \times 2 \text{ places} \times 2 \text{ sexes} = 10080$$

Since we have both desirable and undesirable places overseas (accompanied or unaccompanied by dependents) and avoid repetitive assignments to the short tour, undesirable areas, the number of cells could be as many as 15,120 ($3/2 \times 10,080$). Each new MOS added can add 20 to 42 new management cells. Since a number of low density MOS will have fewer than 100 spaces authorized and many will have fewer than 500 spaces authorized, the cell sizes will be very small, reducing management flexibility, and especially assignment flexibility, drastically.

- Other Complications

Three other problems confront the personnel manager. The space imbalanced MOS (SIMOS) problem rises when more

than about 55 percent of a skill and grade are in overseas spaces. This means that more than half of a soldier's time will be spent overseas which is not conducive to retention. Unfortunately, this situation occurs most frequently in hard-to-fill MOS (radio/voice intercept; radar fire finder, air defense) normally requiring a high quality soldier. For the Patriot AD missile system, the CONUS/oversea ratio will be about 1:2. For some MOS, it is even worse, running as high as 38 percent overseas for MOS 45T, a specialized turret mechanic.

The important point here is that as we modernize and as we develop higher technology weapons, they tend to be placed overseas both earlier and in greater numbers than in the CONUS, producing at least a temporary and often a permanent SIMOS problem.

The second complicating factor is migration into and out of MOS while in the Army. Until the recent past, the Army has been extremely lenient in permitting such migration, especially to encourage first term reenlistments and thus to maintain authorized total strength. The result has been a rush from the less desirable to the more desirable MOS, seriously complicating the fill problem. In 1982, this migration will cease except into understrength

MOS, a new and welcome management policy possible only because Army non-prior accession requirements are so low and the propensity to reenlist is so high.

The third complicating factor is promises made to enlisted men to get them to enlist or reenlist which guarantees them stability at a specified place for a specified time.

- Dynamics Of The Personnel Management Problem.

Given an Army of relatively constant size as it has been for nearly 10 years, the personnel management problem is to replace losses in trained strength as they occur. This means, of course, accessing new people (recruits) with a long enough lead time to cover training and shipping to the unit which will suffer the trained strength loss. (Prior service people who reenlist after a hiatus in service help reduce the requirement for recruits). Clearly there are many estimates to be made, some of which can be done quite accurately based on history. The more important of these are as follows:

- First term and career reenlistment rates by grade, skill and sex;

- Prior service enlistments by grade & skill;
- Attrition rates by grade, skill & sex before expiration of term of service (ETS);
- Attrition rates in training, both in basic and in AIT (Advanced Individual Training) by course and by sex;
- Rate at which overseas soldiers will extend overseas, by grade and skill;
- Retirement and death rates;
- Migration rates.

A foreknowledge must be also had of the following:

- Length of training courses by skill (MOS);
- Oversea fill requirements by grade and skill, and
- MOST IMPORTANT, changes in authorized spaces to be filled by grade and skill.

The last will occur under the following circumstances:

- The Army justifies and the Congress approves a change in the Army's force structure and/or size, which can come about for any of the following reasons:

- ..A phase-down at war's end

- ..A decrease for budgetary purposes

- ..An increase preparatory to war

- ..The addition of a new capability¹ (new kinds of equipment, new technology, new mission)

- ..The addition/deletion of an old capability (more tank battalions: fewer artillery battalions)

¹ The new divisional air defense system increases direct support and general support maintenance requirements by 50% and all are system specific mechanics/repairers.

..The removal or trade-off of an old capability
(light divisions for heavy divisions; old corps
support artillery systems for new)

..An increase²/decrease in basic training time

..An increase²/decrease in course length in AIT or
schools

..Civilianization of military spaces

..Contracting out for functions performed by
military; e.g., messing, maintenance.

- A change in force structure with no change in the
size of the Army, which will likely

..alter the mix of skills

² For some MOS in the Patriot system, the training requirement is 20 months!! (14 months at the Missile and Munitions School, Huntsville, Alabama: 3 months w/the contractor, and 3 months w/a unit before the MOS is awarded).

..alter the grade mix

..alter the length of training, attrition in training, training course, and hence the TTHS account.

- With no change in either size or force structure, but

..A change in grade mix

..A change in MOS mix as major commanders use their allotted spaces differently one year than another, e.g. by substituting in an infantry battalion a mechanic for a company clerk. Or, the same can occur if new organizational or policy requirements are forced on major commanders with no increase in assets, e.g. the requirement for an equal opportunity cell at various organizational levels, or the requirement to "civilianize" certain military spaces to create military spaces for added military requirements in existing units.

All such changes alter the size or makeup of the Army and perpetually change the moving target at which the

personnel manager is shooting. And the extent to which he is surprised by unexpected changes in such things as reenlistment rates, attrition rates, migration rates and recruiting success, will measure the change in speed and direction of the target at which he is shooting i.e., to put the right face at right place at the right time.

Figure 1 below is a simplified version of the dynamics of the enlisted force. The figure applies to all enlisted men and also to any single MOS. From the figure, the following facts may be derived:

1. The size of the annual non-prior device (NPS) accession requirement is determined by:
 - o The ratio of the career to the non-career force size.

The larger the career force and the more stable it is, the smaller the NPS accession requirement. Today, the annual NPS requirement is only about 120,000 and the ratio is about 50:50. At the start of the volunteer Army in 1972, accession requirements were 215,000 and the ratio was about 60 percent non-career to 40 percent careerists.

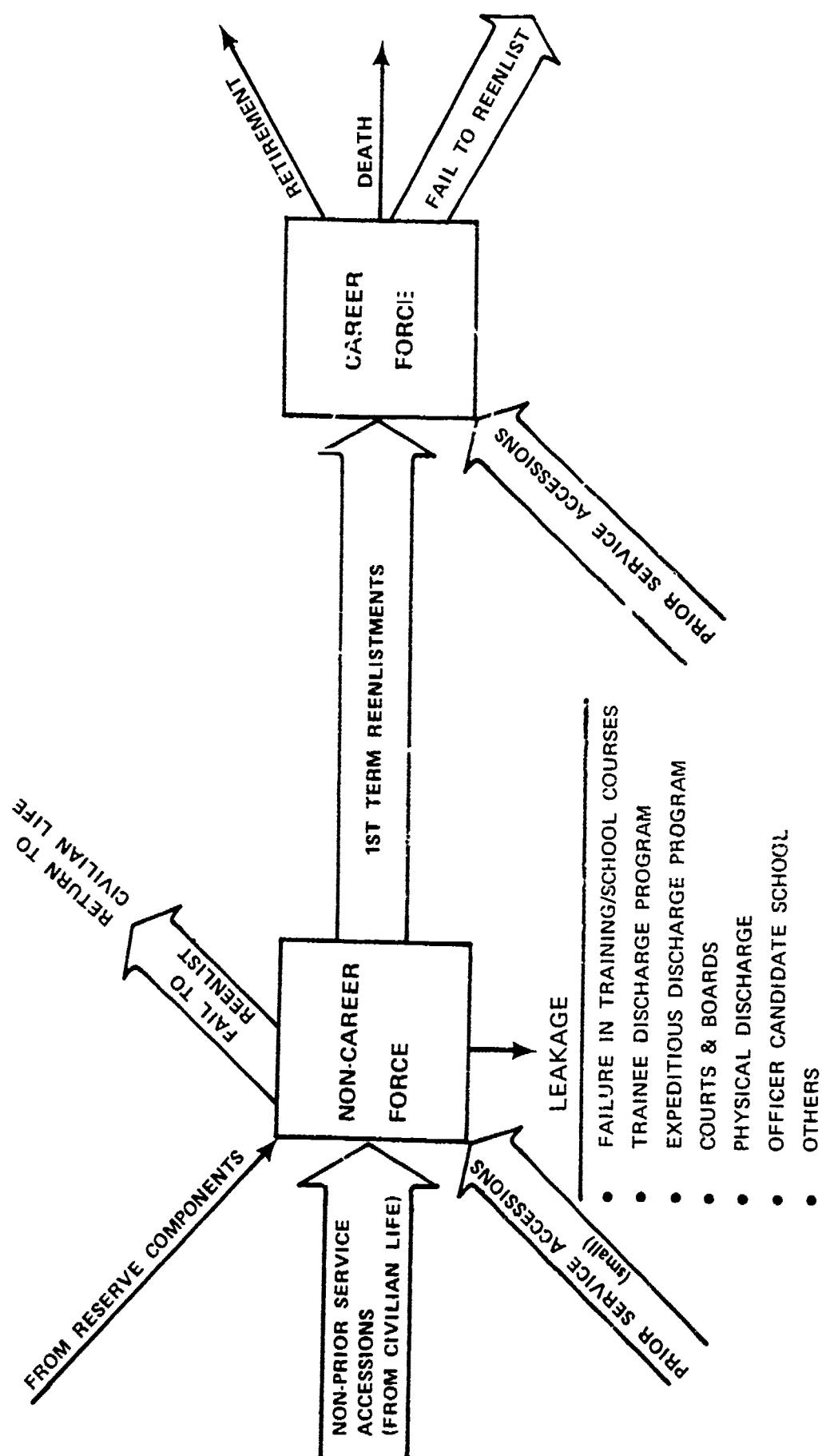


Figure 1. Dynamics of flow, career/non-career forces.

- o The average length of terms of service. The longer the average enlistment, the lower the NPS accession requirement.
- o The size of the "leakage" from the first term force. The higher the quality of accessions (as measured by educational attainments and by scores made in the various aptitude areas of the entrance battery of tests) the more likely is first term success leading to reduced requirements for NPS accessions, and lowered training costs.
- o The propensity for first term soldiers to reenlist. The greater the propensity, the fewer are the NPS requirements.
- o Losses to the career force. Delayed retirement and high career enlistment rates lead to smaller NPS requirements.

2. The relative size of the career force has the following effects:

- o Promotion. The larger the career force, the less opportunity for promotion to the nearly fixed number of E-4 - E9 positions.

- o Reenlistment rates. The less opportunity for promotion, the lower the expected career reenlistment rate.
- o Experience/Maturity. The larger the career force, the older, more mature and more experienced the total force.
- o Pay. The larger the career force, the higher the personnel costs, due primarily to longevity, but also to dependent allowances and, eventually, retirement.

Summary. The above in broad outline covers the part of the Army personnel management system that deals with matters of recruiting and retention to fill the Army force structure spaces. We have said nothing about the promotion system, the retirement system, nor about the myriad systems and procedures - most supported by sophisticated ADP - used to estimate losses, design training programs, schedule training, determine oversea replacement requirements, determine costs, manage the recruit program, etc. Instead, we have tried to outline the major factors that the personnel manager must consider in putting the right face in the right place at the right time and the major complexities he faces.

CHANGES REQUIRED BY LARGE NUMBERS OF
LOW-DENSITY, HIGH TECHNOLOGY MOS

We now turn to a list and short discussion of the factors which will be affected as the Army trends toward low density, high technology, system-specific MOS. In general, it can be said that the trend will lead to a larger, more costly Army and to increased complexity for personnel managers.

1. Skills will be much more specific and unique, leading to the following:

- More MOS¹ and hence more and smaller personnel cells to be managed. This could mean many MOS where a soldier could not expect a career pattern leading to E-9 unless specialist ratings are authorized all the way to the top enlisted grades.

¹ As an example, it takes 1 MOS to repair the field artillery FADC computer and counter mortar radar. It takes 10 MOS in maintenance support for the new field artillery fire control system (TACFIRE).

- Longer training courses and hence both of the following: higher TTMS account and shorter time in units; i.e. a lower return on the training investment. Both require increases in Army strength for the same size force structure and both increase costs. In addition, manpower devoted to training will increase.
- More difficult training courses which means higher attrition rates and the need for higher qualifying scores in aptitude areas of the ASVAB (Armed Services Vocational Aptitude Battery). Higher attrition rates mean more recruits are needed, an increase in strength is needed, and costs will increase.
- More and more expensive training courses with fewer students in each, increasing instructor-student ratio, instructor overhead and cost.

2. Trained Army soldiers will be much more in demand by and have far greater opportunities in the civilian economy, leading to the following:

- o Lower reenlistment rates, both first term and career
- o The need for very high bonuses to assure retention
- o The need to increase the "richness" of the grade mix to afford greater promotion opportunity as an aid to retention.

3. There will probably be more space imbalanced MOS (SIMOS) as technologically rich units will tend to be overseas in greater number than in CONUS, leading to the need for imaginative new management techniques, such as:

- o Bonuses for extending overseas
- o Free home leaves for extending overseas
- o Promotions for extending overseas
- o Extra time toward retirement for extending overseas.

Note that some of this can be controlled by a properly designed phase-in program - designed in such a way that new equipment is issued in CONUS before going overseas or in a balanced CONUS - overseas issue.

no opportunity for placing a person trained in one MOS in the space of a different MOS.

- Much less opportunity than today for on-the-job training; much more need for school training.
- A need for strict controls on migration out of high technology MOS.
- Because new equipments are so different technologically than those being replaced, so much more expensive, and hence will phase in over a long period of time, the Army is faced in both the active Army and especially in the Reserve Components with the need to recruit, train, assign, replace, promote - in short, to manage - two quite different sets of people for two quite different sets of equipment designed to do the same task.
- There are likely to be many more critical MOS needing management by exception.

ESTIMATES OF EFFECTS OF CHANGES REQUIRED

Let us now estimate the effects on the Army of the changes outlined above, using some realistic, but not actual data.

Strength & Supportability

Let us consider two MOS, one MOS (A) will be an easy-to-train, dense, non-technological skill; the other (B) will be a system specific, low density, high technology MOS. The following data are available:

Table 4. Basic Data on Two Assumed MOS.

	MOS	
	A ¹	B ²
SPACES IN FORCE STRUCTURE	2000	200
1ST TERM ATTRITION IN		
TRAINING (%)	15	31
UNIT (%)	11	11
REENLISTMENT RATES		
1ST TERM (%)	40	20
CAREER (%)	75	50
LENGTH OF TRAINING (WKS)	12	32
TRANSIENTS, HOLDEE, STUDENT		
(TPS) (%)	6	6
AVERAGE TERM OF SERVICE (YRS)	3	3
CAREER: NON-CAREER MIX	50:50	50:50

¹SIMILAR TO MOS 11B, II.7/ TRYMAN.

²SIMILAR TO MOS 31S, FIELD GENERAL COMSEC REPAIRMAN

Strength Impact - First Term Force

MOS A (Similar to MOS 11B, Infantryman)

- 1st term force will actually consist of 1000 force structure soldiers plus a 6% allowance for THS or 1060.
- 1st term force will lose $1/3$ of 1060 per year due to expiration of term of service (ETS), or 353.
- In addition, force will lose each year $1/3 \times 11\% \times 1060$ due to miscellaneous attrition or 39.
- These 392 trained strength losses must be replaced each year.
- Input to training, however, must account for 15% attrition in training, thus $X - .15X = 392$; $X = 461$ recruits and 69 losses in training.
- We will assume that losses occur half way through training, or at the 6 weeks point.

- Now, since training takes only 12 weeks, we may compute training manyears as follows:

$$\frac{12}{52} \times 392 + \frac{12}{52} \times \frac{1}{2} \times 69 = 98$$

which represents the average number of trainees in the Army at any one time during the year to turn out 392 trained strength soldiers during the year.

- Total Army strength to support this MOS(A) in the 1st term force is:

1000 in units

60 for THS

98 in training

1158 Total, which is also the number of manyears needed

- Total recruits needed is 461

MOS B (Similar to MOS 31S, Field General COMSEC Repairman)

- First term force will consist of 100 force structure spaces plus a 6% allowance for THS or 106 trained people to man the 100 force structure spaces.
- 1st term force will lose 1/3 of 106 per year on average due to ETS or 35.
- In addition, the force will lose $1/3 \times 11\% \times 106 = 4$ per year due to miscellaneous attrition.
- These losses of 39 must be replaced each year.
- Input to training must account for 31% attrition in training; thus $X - .31X = 39$ and $X = 59$ recruits and 18 losses in training which we will assume occur at mid-point in the training.
- Since training takes 32 weeks, we may compute average trainee strength (or trainee manyears) as follows:

$$\frac{32}{52} \times 39 + \frac{32}{52} \times \frac{1}{2} \times 18 = 30$$

- Total Army strength (and manyyears) to support MOS B in the first term force is:

100 in units

6 for THS

30 in training

136 Total

- Total recruits needed is 57

We can now compare the two MOS for the first term force,

Table 5. Annual Recruits, Strength, & Manyears Required Per 100 Force Structure Spaces.

	MOS		DIFFERENCE
	A	B	
RECRUITS/100	46	57	11
STRENGTH & MANYEAR PER/100	116	136	20

Thus, if 1st term force structure spaces of about 250,000 were to be changed from MOS like A to MOS B, we would need:

$$\frac{250,000}{100} \times 11 = 27,500 \text{ more recruits each year}$$

$$\frac{250,000}{100} \times 20 = 50,000 \text{ increase in Army end strength and manyears (all trainees)}$$

In addition, of course, there would need to be an increase in the recruiting force and in the training force of about 11 and 20 percent respectively.

We may conclude that as MOS change from high density, easy-to-train, low technology to low density, difficult-to-train, high technology:

- Army end strength must increase significantly to accomodate longer course lengths, higher training attrition, and probably lower reenlistment rates.
- Army manyears must increase.
- More recruits will be needed for the same size force structure.

- Manpower costs will increase significantly to pay for more strength and more manyears for the same number of force structure spaces.
- It will be highly cost effective to pay very high bonuses for very high quality enlistees (perhaps only after successful completion of AIT courses) to reduce training attrition.

Supportability Impact - Career Force

Continuing our example with MOS A & B, let us look at the supportability of the career force. (See Table 6 on the following page.)

We may conclude that as MOS change from high density, easy-to-train, low technology to low density, difficult-to-train, high technology:

- The career force will become more difficult to sustain.
- It will be highly cost effective to pay very high reenlistment bonuses both for first term and for career reenlistments.

Table 6. Career Supportability.
(Two Assumed MOS)

	MOS	
	A	B
FORCE STRUCTURE SPACES	2000	200
CAREER SPACES, TRAINED	1000	100
1ST TERM SPACES, TRAINED	1000	100
CAREER FORCES W/THS, TRAINED	1060	106
1ST TERM FORCES W/THS, TRAINED	1060	106
1ST TERM REENLISTMENT RATES (%)	40	20
1ST TERM ETS LOSSES (assuming 3 year enlistment)	353	35
1ST TERM GAINS TO CAREER FORCE	141	7
	(.4 x 353)	(.2 x 35)
CAREER REENLISTMENT RATES (%)	75	50
CAREER LOSSES DUE ETS	265	27
(assuming 4 year enlistment)	265	27
CAREER REENLISTMENTS	($\frac{1}{4}$ x 1060)	($\frac{1}{4}$ x 106)
	199	14
	(.75 x 265)	(0.5 x 27)
SUMMARY:		
LOSSES IN CAREER FORCE	265	27
GAINS IN CAREER FORCE	340 (199 + 141)	21 (14 + 7)
Over (+) Short (-)	+75	-6
SUPPORTABILITY	Yes, with excess of 75, allowing Army choice	No, 21% short of need (6/28)

Flexibility Impact - Enlisted Force

While it is difficult to cost the increased management complexities of managing added MOS cells, it may be enlightening to look at the extremes.

If all 680,000 enlisted spaces required the same training, i.e., there were only one set of skills and one MOS in the Army, we would have perfect management flexibility. Every trained soldier could be put into any force structure slot (ignoring grade). There would be only one training course, no SIMOS problem, simple recruiting and full assignment flexibility. Shortages would be easily allocated in strict accord with a set of priorities; mistakes in management could be easily overcome.

If all 680,000 spaces were different, we would need 680,000 courses (less THS!), no assignment flexibility, 100% SIMOS problem, and a recruiting nightmare wherein every recruit would have to be signed up and trained for a unique space in a specific unit to replace a unique individual. Management errors would be more frequent and more difficult to correct quickly.

Clearly as we trend from the former to the latter, recruiting, training, assignment, and fair promotion policies become more complex and difficult.