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Group Warfighting Task Analysis

Kevin C. Uliano

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Group Warfighting Task Analysis

October 14, 1991

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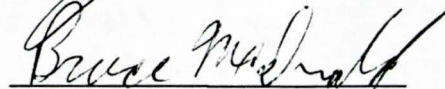


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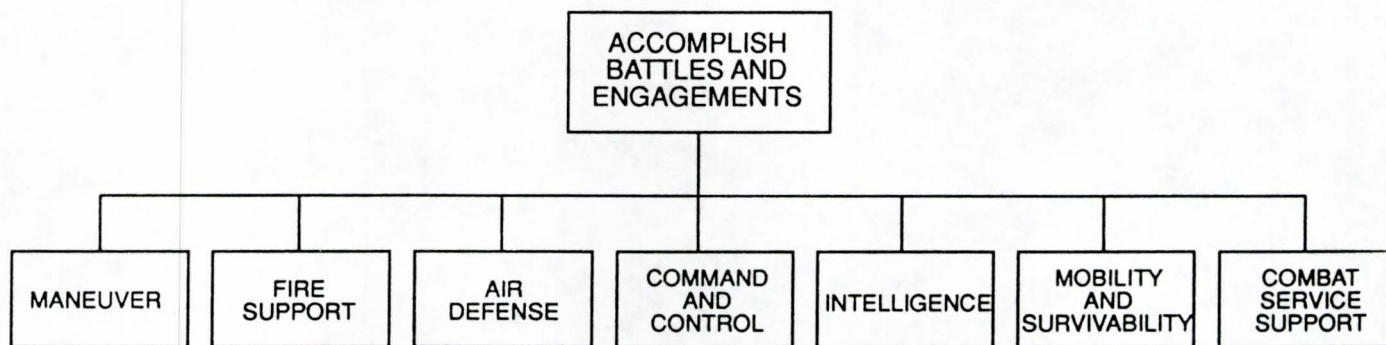
STANDARDS DEVELOPMENT FOR DISTRIBUTED INTERACTIVE SIMULATION

Task 2: Develop Environment Correlation Measures for Terrain and Features

Subtask 2A. Group Warfighting Tasks

1.0 INTRODUCTION

This document provides a warfighting task listing extracted from the TRADOC publication PAM 11-9, "Blueprint of the Battlefield" (Department of the Army, 1989). These tasks comprise the tactical level of war and include all task levels from the Battlefield Operating System (BOS), functions and subfunctions, generic tasks, and finally proponent tasks. Figure 1 shows the seven battlefield operating systems (BOS). Each of the BOSs include functions performed by many segments of the force in accomplishing a mission. In this report, we analyzed the lowest level tasks (i.e., generic and proponent) to determine how the successful performance of a specific task might be affected by terrain and features of a simulated battlefield.



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FIGURE 1. SEVEN BATTLEFIELD OPERATING SYSTEMS (BOS)

2.0 TERRAIN/FEATURES EFFECTS

Five terrain/features variables that could potential impact the performance of warfighting tasks in a distributed interactive simulation (DIS) environment are listed below:

- point-to-point intervisibility
- target/background contrast
- ballistic trajectory/terrain height
- signal attenuation
- map/terrain image correlation

3.0 BOS TASK HIERARCHIES

Appendix A, Figures 2 through 8c show the task hierarchy in each of the seven BOSS analyzed. The generic tasks are not depicted in these figures.

4.0 TASKS x TERRAIN/FEATURES MATRIX

The Tasks x Terrain/Features Matrix shows all the warfighting tasks listed by BOS on the left. On the right side of the matrix an "x" is placed in a column to indicate what terrain/features variable(s) impact the performance of the task. For example, direct fire/concealment tasks would be impacted by point-to-point intervisibility. Note that a given task could be influenced by more than one terrain/features variable. The lowest level tasks (i.e., generic tasks are shown in bold typeface). The variables are shown in the key at the bottom of each page of the matrix and are coded as follows:

- point-to-point intervisibility (P)
- target/background contrast (T)
- ballistic trajectory/terrain height (B)
- signal attenuation (S)
- map/terrain image correlation (M)

	P	T	B	S	M	NA
Maneuver BOS						
Move						
Position/Reposition Forces						
Prepare for Movement						
Conduct Personnel & Equipment Inspections						X
Load Combat Supplies, Munitions, & Equipment						X
Load Personnel						X
Move On or Under Surface						
Move While Mounted						
Initiate Mounted Movement	X	X				
Use Mounted Formations & Movement Techniques	X	X				
Respond to Vehicle Emergencies	X	X				
Transfer Between Mounted Modes of Transportation	X	X				
Move While Dismounted						
Initiate Dismounted Movement	X	X				
Use Mounted Formations & Movement	X	X				
Respond to Vehicle Emergencies	X	X				
Transfer Between Mounted Modes of Transportation	X	X				
Move Through Air						
Initiate Air Movement						X
Use Air Formations & Movement Techniques	X	X			X	
Compensate for In-flight Equipment Emergencies						X
Prepare for Unloading						X
Close Into Tactical Position						
Disembark from Conveyance	X	X				
Deploy Into Fighting/Halt Position	X	X				
Deploy Into Assembly/Staging Area	X	X				
Deploy Into Support Area	X	X				
Negotiate Terrain						
Traverse Unimproved Terrain	X	X				
Ford or Swim Water Features	X	X				
Cross Gaps in Stride	X	X				
Self-breach Obstacles	X	X				
Perform Self-recovery	X	X				
Navigate						
Determine Distance	X	X			X	
Determine Direction	X	X			X	
Determine Location	X	X			X	
Determine Elevation/Altitude	X	X			X	
Determine Select/Route	X	X			X	
Provide Data for Navigational Aids	X	X			X	
Maintain Orientation	X	X			X	
Determine Rate of Movement	X	X			X	

P=Point to Point Intervisibility

T=Target/Background Contrast

B=Ballistic Trajectory/Terrain Height

S=Signal Attenuation

M=Map/Terrain Image Correlation

NA=Not Applicable

	P	T	B	S	M	NA
Engage Enemy						
Employ Direct Fire Targets						
Process Direct Fire Targets						
Select Direct Fire Targets						
Designate Target Areas & Fields of Fire	X	X			X	
Prepare Range Cards/Sector Sketches	X				X	
Choose Direct Fire Target for Engagement	X	X			X	
Select Direct Fire System						
Determine System Capability						X
Determine System Availability						X
Choose Direct Fire Weapon for Engagement						X
Engage Direct Fire Targets						
Assemble/Emplace Direct Fire Weapon						X
Conduct Direct Fire Weapon System Inspections						X
Update Fire Control System						X
Prepare Direct Fire Ammunition						X
Load Direct Fire Weapon						X
Aim Direct Fire Weapon	X	X				
Fire Direct Fire Weapon	X	X				
Conduct Close Combat						
Employ Hand-delivered Weapons	X	X				
Employ Hand-to-Hand Combat Techniques	X	X				
Control Terrain						
Control Terrain Through Fire or Fire Potential	X				X	
Occupy Terrain	X				X	
Occupy Fighting Positions	X				X	
Occupy Support Positions	X				X	
Fire Support BOS						
Process Ground Targets						
Select Target to Attack						
Determine Target Selection Standards						X
Compare Sensor Data to Target Selection Standards						X
Perform Target Duplication Check		X				
Determine Moving Target Intercept Point					X	
Create Target Build-up Report						X
Create Target Nomination List						X
Perform Target File Maintenance						X
Choose Targets						X
Select Fire Support Attack System						
Determine System Capability						
Determine Fire Support Systems & Ammunition Capable of Defeating Target						X
Determine Rank Order of Fire Support Systems Capable of Defeating Target						X
Determine Fire Unit Capability						X

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Determine System Availability	P	T	B	S	M	NA
Determine Physical Environment Restrictions	X		X		X	
Determine Time Restrictions						X
Determine Restricted Fire Support Systems						X
Select System						
Develop Order to Fire						
Conduct Tactical Fire Control						X
Conduct Technical Fire Direction						X
Issue Fire Commands				X		
Issue Message to Observer/Requestor				X		
Engage Ground Targets						
Conduct Lethal Engagement						
Conduct Surface Attack						
Locate Firing Position	X				X	
Assemble/Emplace Weapon System						X
Orient Weapon	X				X	
Realign Weapon Sighting System						X
Conduct Weapon System Inspections						X
Receive Firing Data				X		
Prepare Ammunition						X
Set Firing Data						X
Load/Enable Weapon						X
Fire Weapon	X	X			X	
Air Defense BOS						
Process Air Targets						
Select Air Targets to Attack						
Receive Early Warning/Target Information				X		
Compare Air Target Data to Target Selection Standards						X
Determine Priorities of Engagement						X
Choose Air Targets						X
Select System for Air Targets						
Determine System Capability for Engaging Air Targets						
Consider Weapons Engagement Zones						
Consider Weapons System Characteristics						X
Determine System Availability for Air Engagement						
Consider Operational Availability and Missile Status						X
Consider Weapons Control Status						X
Determine Time Restrictions						X
Select System for Air Engagement						
Develop Order to Fire at Air Targets						
Review Airspace Control Guidance/Restrictions					X	
Issue Fire Control Orders				X		
Attack Enemy Air Targets					X	

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Employ Air to Air Weapons	P	T	B	S	M	NA
Employ Surface to Air Weapons						
Employ Air Defense Artillery						
Emplace Weapon System						X
Establish Sector of Fire/Primary Target Line	X	X	X		X	
Prepare Weapon for Engagement						X
Load/Enable Weapon						X
Engage Air Targets	X	X	X		X	
Perform Weapon System Inspections						X
Employ Other Unit Fires						
Engage Air Targets with Small Arms, Crew served Weapons, & Cannons	X	X				
Engage Air Targets with Other Surface Means	X	X				
Conduct Nonlethal Engagement of Air Targets						
Incapacitate Aircrews	X	X				
Disable Airborne Equipment	X	X				
Conduct Jamming of Noncommunications Equipment	X	X			X	
Deny Airspace						
Reduce Navigability						X
Reduce Airborne Weapon Effectiveness						X
Command and Control BOS						
Acquire and Communicate Information and Maintain Status						
Communicate Information						
Receive & Transmit Mission				X		
Receive & Transmit Enemy Information				X		
Receive & Transmit Terrain & Weather Information				X		
Receive & Transmit Friendly Troop Information				X		
Exchange Friendly Force Periodic & As required Reports				X		
Exchange Friendly Force Spot Reports				X		
Manage Means of Communicating Information						
Establish Communications Networks & Facilities					X	
Establish System Control Facilities, Network Management, & Spectrum Management					X	
Establish & Operate Messenger Service						X
Employ Communications Procedures				X		
Employ Technical Control Procedures						X
Employ Audio & Visual Signals	X	X		X		
Maintain Information & Force Status						
Store Information						
Maintain Operations Records & Reports						X
Maintain Administrative Records & Procedures						X
Maintain Data Bases						X
Display Information						
Organize & Summarize Information for Display						X
Display Operational Information						X

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Publish & Reproduce Information	P	T	B	S	M	NA
Perform Editorial Services & Conduct Technical						X
Composition of Original Material						X
Produce Printed Materials						X
Produce Audiovisual Material						X
Manage Information Distribution						
Determine Information Routes						X
Select Distribution Means						X
Assess Situation						
Review Current Situation						
Analyze Mission						
Determine Intent & Concept of Higher Commander					X	
Identify Stated & Implied Tasks					X	
Determine What Action is Required, When, Where, & Why					X	
Determine Constraints of Actions					X	
Fuse Information						
Determine Nature and Sources of Relevant Information						X
Determine form and Content of Integrated Information Product						X
Produce Integrated Information Product						X
Project Future Requirements						
Examine Facts and Assumptions					X	
Determine and Evaluate Trends					X	
Determine Probable Requirements and Set Priorities					X	
Decide on Need for Action or Change						
Determine Actions						
Issue Planning Guidance						
Restate the Mission and Commander's Intent						X
Estimate Time Lines for Planning Sequence						X
Provide Courses of Action Specifically for Consideration						X
Provide Operational Limitations or Constraints						X
Provide Other Guidance						X
Establish Priorities for Planning						X
Initiate Appropriate Warning Orders						X
Initiate Estimate of Situation						X
Develop Courses of Action						
Conduct Staff Studies					X	
Provide Estimates of the Situation					X	
Determine Alternative Courses of Action					X	

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Analyze Courses of Action	P	T	B	S	M	NA
Use Analyses of Enemy Capabilities						X
Wargame Each Course of Action Against Each Probable Enemy Course of Action					X	
Incorporate Improvements						X
Define Requirements for Any Other Actions in Conjunction with Each Course of Action					X	
Determine Advantages and Disadvantages of Each Course of Action						X
Compare Courses of Action						
Summarize Advantages & Disadvantages of One Course of Action Against Advantages & Disadvantages of Each of the Other Courses of Action						X
Select or Modify Course of Action						
Choose a Course of Action					X	
Restate Mission					X	
State Commanders Concept of Operation & Intent					X	
Establish Priorities					X	
Direct and Lead Subordinate Forces						
Prepare Plans or Orders						
Develop & Complete Plans or Orders						
Prepare Plans & Orders in Accordance with Commander's Guidance						X
Assemble & Format Information						X
Prepare Plan or Order for Distribution						X
Coordinate Support						
Coordinate Army, Other Services, & Allied Support				X	X	
Tie in Physically with Units on Left & Right				X	X	
Coordinate Own Plans with Units on Flanks, Forward, & Rear				X	X	
Coordinate Combat Support for Own Plan of Operation				X	X	
Coordinate Combat Service Support for Own Plan of Operation				X	X	
Approve Orders						X
Issue Orders				X	X	
Provide Command Presence				X	X	
Intelligence BOS						
Collect Information						
Collect Information on Situation						
Collect Threat Information						
Conduct Surveillance					X	
Collect Captured Documents and Equipment						X
Collect Situation and Spot Report Information				X	X	
Collect Information from Refugees, Detainees, and Prisoners						X
Conduct Counterintelligence Investigations						X

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Collect Physical Environment Information	P	T	B	S	M	NA
<u>Collect Information on Presence of NBC Agents/Contaminants</u>						X
<u>Gather Meteorological Data</u>						X
<u>Gather Geographical Data</u>						X
<u>Determine Sources of Natural Resources</u>						X
<u>Collect Road and Traffic Data</u>						X
<u>Locate/Detect Obstacles</u>						X
<u>Gather Area Battle Damage Data</u>						X
<u>Collect Endemic Disease Information</u>						X
Collect Information on Social/Political/Economic Environment						
<u>Collect Information on Public Administration</u>						X
<u>Collect Information on Political Environment</u>						X
<u>Collect Information on Economics, Commerce, & Agriculture</u>						X
<u>Collect Information on Civilian Population, Culture, & Social Structures</u>						X
<u>Collect Information on Facilities & Utilities Stable for Host Nation</u>						X
Support Functions						
Collect Target Information						
<u>Search for Targets</u>	X	X			X	
<u>Designate Search Sectors & Priorities</u>	X				X	
<u>Scan Sectors</u>	X	X			X	
Detect Targets						
<u>Disclose Object of Interest</u>	X	X		X		
<u>Provide Potential Target Alert</u>	X	X		X		
<u>Assess Military Significance</u>						X
Locate Targets						
<u>Determine Target Location</u>	X	X			X	
<u>Determine Target Disposition</u>	X	X			X	
Identify Targets						
<u>Determine Friend or Foe</u>	X	X				
<u>Discriminate Hostile Actions</u>	X	X				
<u>Determine Class, Type, Size, & Name of Target</u>	X	X				
<u>Determine Target Technical Characteristics</u>	X	X				
Conduct Post-Attack Target Damage Assessment						
<u>Determine Extent of Target Damage</u>	X	X				
<u>Determine if Target is Functional</u>	X	X				
<u>Determine Time & Effort Needed to Repair Target</u>	X	X				
<u>Compare Attack Results with Desired Effect</u>	X	X				
Process Information						
Evaluate Threat Information						
Review Holdings						
<u>Assemble Existing Threat Information</u>						X
<u>Determine Reliability & Credibility of Information</u>						X
<u>Identify Threat Information Gaps</u>						X
<u>Request Threat Information</u>						X

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Consider Enemy Doctrine	P	T	B	S	M	NA
<u>Evaluate Threat Capabilities & Vulnerabilities</u>						X
<u>Select Information for Enemy Doctrinal Templates</u>						X
Evaluate Physical Environment Information						
Review Holdings						
<u>Assemble Existing Terrain Information</u>	X				X	
<u>Assemble Existing Climatological Information</u>	X				X	
Consider Status						
<u>Determine Additional Information Requirements</u>						X
<u>Develop Weather Forecast</u>						X
<u>Evaluate Weather Information</u>						X
<u>Conduct Terrain Analysis</u>	X				X	
Develop Impacts						
<u>Determine Terrain Effects on Courses of Action</u>					X	
<u>Determine Weather Effects on Courses of Action</u>						X
Evaluate Social/Political/Economic Environment						
<u>Analyze the Significance of Social, Political, & Economic Events & Attitudes in the Area of Responsibility</u>						X
<u>Evaluate Resources/Support Available in Host Nation or Area of Responsibility</u>						X
<u>Identify Host Nation or Area of Responsibility Military or Civil Support Requirements</u>						X
<u>Request Social/Political/Economic Environment Information</u>						X
Integrate Intelligence Information						
Develop Enemy Intentions						
<u>Develop Alternative Threat Courses of Action</u>					X	
<u>Project Probable Threat Organization & Composition</u>						X
<u>Consider Impacts of Physical Environment on Enemy Courses of Action</u>						X
<u>Consider Impact of Social/Political/Economic Environment on Enemy Courses of Action</u>						X
<u>Project the Most Probable Threat Course of Action</u>					X	
<u>Determine Friendly Tactical Decision Points</u>					X	
Develop Targeting Information						
<u>Evaluate Target Technical Characteristics</u>						X
<u>Develop High Value Target (HVT) & High Payoff Target (HPT) Lists</u>						X
<u>Develop Direct Targeting Data</u>						X
<u>Develop Correlated Targeting Data</u>						X
Prepare Intelligence Reports						
<u>Prepare Reports on Target Development</u>						X
<u>Prepare Periodic & As Required Target Reports</u>						X
<u>Prepare Target Spot Reports</u>						X
<u>Prepare Reports on Enemy Intentions</u>						X
<u>Prepare Reports on the Battlefield Area</u>					X	
<u>Prepare Reports on Enemy Situation</u>					X	
<u>Prepare Periodic & As Required Enemy Reports</u>					X	
<u>Prepare Enemy Spot Reports</u>					X	

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Mobility and Survivability BOS	P	T	B	S	M	NA
Provide Mobility						
Overcome Obstacles	X				X	
Breach Obstacles	X				X	
Breach Minefields	X				X	
Neutralize Mines in Lanes	X				X	
Mark Lanes Through Minefield	X				X	
Proof Lanes Through Minefield	X				X	
Clear Minefield	X				X	
Reduce/Clear Obstacles						
Reduce/Clear Obstacles Mechanically	X				X	
Reduce/Clear Obstacles Using Demolitions	X				X	
Reduce/Clear Obstacles Using Chemicals	X				X	
Reduce/Clear Obstacles Using Directed Energy	X				X	
Cross Gaps						
Prepare/Improve Access & Egress Points	X				X	
Employ Assault Gap Crossers	X				X	
Employ Assault Float Bridging	X				X	
Employ Follow on Float Bridging	X				X	
Construct Military Standard Fixed Bridges	X				X	
Construct Non-standard Fixed Bridges	X				X	
Construct Rafts & Other Expedients	X				X	
Enhance Movement						
Construct/Repair Combat Roads & Trails						
Delineate Routes & Sites	X				X	
Clear Ground Cover						X
Perform Earthwork						X
Provide Drainage						X
Stabilize Soil						X
Prepare Surface						X
Construct/Repair Forward Airfields and Landing Zones						
Facilitate Movement on Routes						
Control Road Traffic						X
Control Air Traffic						X
Provide Refugee Control						X
Provide Straggler Control						X
Provide Countermobility						
Secure/Select Location of Obstacles						
Review Terrain Analysis of Existing Obstacles	X				X	
Select Sites to Enhance the Obstacle Value of Terrain	X				X	
Emplace Obstacles						
Emplace Mines						
Install Minefield					X	
Deliver Area Mines					X	

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Prepare/Emplace Constructed Obstacles	P	T	B	S	M	NA
Design Obstacle						X
Select Construction Material						X
Construct Obstacle						X
Position Obstacle					X	
Emplace Demolition Obstacles						
Calculate Explosive Requirement						X
Select Explosives						X
Position Explosives					X	
Emplace Chemical Obstacles						
Design Chemical Obstacles						X
Select Chemical Obstacle Agent						X
Select Chemical Obstacle Delivery Means						X
Dispense/Deliver Chemical Obstacle Agent					X	
Replenish Chemical Obstacle						X
Mark Obstacles						
Identify Area for Marking	X				X	
Prepare & Emplace Markers					X	
Prepare Obstacles Location Report					X	
Detonate Mines/Explosives						
Fuse Mines/Explosives						X
Arm Mines/Explosives						X
Explode Mines/Explosives on Command						X
Enhance Survivability						
Provide Battlefield Hazard Protection						
Protect Individuals & Systems						
Employ Electronic Counter Countermeasures (ECCM)						
Discriminate Interference from Jamming				X		
Take Anti jamming Actions				X		
Change Mode of Operations				X		
Prepare Fighting Positions						
Construct Weapon Firing Platform/Position					X	
Construct Parapets						X
Excavate Defilade Positions/Trenches						X
Clear Concealed Displacement Routes						X
Prepare/Augment Overhead Cover						X
Flatten or Reduce Spoil						X
Employ Protective Equipment						
Use Protection Against Ballistic Effects						X
Use Protection Against Contaminants						X
Use Protection Against Natural Environment						X
Use Protection Against Electromagnetic Energy						X

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	P	T	B	S	M	NA
Remove Battlefield Hazards						
Decontaminate Personnel & Systems						
Decontaminate Individual Soldier & Equipment						
Perform Systems & Supplies Decontamination						X
Perform Hasty Decontamination						X
Perform Deliberate Decontamination						X
Provide Explosive Ordnance Disposal (EOD)						
Determine Location of Unexploded Ordnance					X	
Evaluate/Identify Unexploded Ordnance						X
Render Unexploded Ordnance Safe						X
Recover Unexploded Ordnance						X
Dispose/Destroy Unexploded Ordnance						X
Employ Operations Security						
Employ Signals Security (SIGSEC)						
Employ Communications Security (COMSEC)						
Employ Physical Security Measures						X
Control Access to Equipment						X
Employ Document Security Measures						X
Destroy Equipment & Documents						X
Maintain Emission Security						
Encode/Decode Messages						X
Install & Operate Communications Security Equipment						X
Authenticate Messages						X
Avoid Predictable Patterns of Usage						X
Control Message Length & Frequency of Transmission						X
Maintain Electronic Security						
Conceal Electromagnetic Signatures				X		
Deny Location & Identification of Emitters				X		
Employ Concealment Techniques						
Employ Camouflage						
Use Natural Material & Terrain Features	X	X				
Use Camouflage Materials	X	X				
Employ Noise, Light, & Physical Evidence Controls						
Suppress Noise Signatures						X
Suppress Light Signatures						X
Reduce/Remove Physical Evidence of Friendly Force Route or Site Occupation						X
Employ Smoke/Obscurants						
Obscure Immediate Area						X
Obscure Wide Area						X
Conduct Deception in Support of Tactical Operations						
Employ Physical Deception						X
Employ Visual Deception	X	X				
Employ Auditory Deception						X
Employ Olfactory Deception						X

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	P	T	B	S	M	NA
Employ Electronic Deception						
Employ Imitative Electronic Deception						
Introduce False Information Into Enemy Communications Networks				X		
Introduce False Radiation Into Enemy Electronics Systems				X		
Employ Simulative Electronic Deception						
Simulate Emissions of a Nonexisting Unit				X		
Simulate Electronic Equipment Capabilities				X		
Generate False Unit Location Emissions				X		
Employ Manipulative Electronic Deception						
Employ Manipulative Communications Deception				X		
Employ Manipulative Noncommunications Deception						X
Provide Security						
Identify Friendly Force Profiles (Signatures, Patterns, & Indicators)						X
Identify Friendly Force Vulnerabilities						X
Establish Local Security Patrols and Positions						X
Employ Anti-intrusion Measures				X		
Employ Early Warning Measures						X
Combat Service Support BOS						
Arm	X	X		X	X	
Fuel	X	X		X	X	
Fix						
Distribute	X	X		X	X	
Fix/Maintain Equipment						X
Perform Preventive Maintenance						
Clean Equipment						X
Perform Preventive Checks						X
Perform Minor Adjustments						X
Lubricate Equipment						X
Preserve Equipment						X
Recover						
Determine Recovery Method						X
Recover Disabled Equipment						X
Evacuate Disabled Equipment to Collection/Service Point						X
Diagnose						
Perform Fault Isolation/Troubleshoot Malfunctions						X
Assess Damage						X
Determine Level of Repair						X
Determine Repair Parts Required						X
Determine Serviceable Parts/Equipment						X
Substitute						
Perform Controlled Exchange of Parts						X
Perform Cannibalization						X
Exchange						

P=Point to Point Intervisibility

T=Target/Background Contrast

B=Ballistic Trajectory/Terrain Height

S=Signal Attenuation

M=Map/Terrain Image Correlation

NA=Not Applicable

Repair	P	T	B	S	M	NA
Test/Check Equipment						X
Adjust, Align, and Repair Components and Assemblies						X
Repair and Modify Defective End Items						X
Replace Components and Assemblies						X
Remove/Replace Piece Parts						X
Mark/Paint Equipment						X
Return						
Provide Operational Readiness Item to Supply Stream or Float						X
Provide Repaired Equipment to Units						X
Man the Force						
Distribute						
Provide Field Services						
Clothing Exchange and Bath						
Obtain Fresh Water, Cleaning Materials and Drainage						X
Prepare Shelter						X
Operate Bath Unit						X
Operate Delousing Unit						X
Provide Clothing Exchange						X
Provide Sundries, Convenience Items, and Other Soldier Comfort Services						X
Graves Registration						
Operate Collection Point						X
Recover Deceased Soldiers						X
Determine and Report Identities of Deceased Soldiers						X
Register Burial Sites						X
Salvage						
Receive Material at Collection Point						X
Classify Material						X
Determine Disposition of Material						X
Dispose of Material						X
Laundry and Renovation						
Collect Repairable Clothing and Textiles						X
Obtain Water and Drainage						X
Repair Clothing and Textiles						X
Launder Clothing						X
Reimpregnate Clothing						X
Bakery						
Obtain Raw Ingredients						X
Receive Bread Requirements						X
Operate Field Bakery Equipment						X
Prepare and Evaluate Bread Products						X
Prepare Product for Shipment						X
Feeding						
Obtain Rations						X

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	P	T	B	S	M	NA
Operate Field Kitchen Equipment						
Prepare Rations						
Serve Prepared Rations						
Perform Field Kitchen Sanitation						
Provide Personnel Service Support						
Provide Personnel Administration Services						
Maintain Personnel Strength						
Provide Strength Management						X
Conduct Replacement Operations						X
Perform Casualty Reporting						X
Provide Career Management Support						
Provide Officer Accessions						X
Provide Promotions and Reductions						X
Control Personnel Evaluation						X
Provide Awards and Decorations						X
Record Personnel Information						X
Provide Soldier Support Activities						
Conduct Postal Operations						X
Provide Morale, Welfare, and Recreation Activities						X
Provide Band Support						X
Provide Finance Services						
Provide Commercial Accounts Services						X
Perform Pay Services						X
Perform Disbursing Services						X
Perform Accounting Services						X
Provide Travel Pay						X
Provide Resource Management						
Perform Chaplaincy Activities						
Provide Religious Support						
Conduct/Administer Sacraments, Rites, and Ordinances						X
Conduct/Provide Worship Services						X
Provide Ministries to Promote Individual Beliefs and Army Values						X
Provide Pastoral Care and Counseling						
Advise on Moral and Ethical Issues						
Provide Public Affairs Services						
Provide Command Information						X
Advise/Assist in Community Relations						X
Provide Public Information						X
Provide Legal Service Support						
Interpret Administrative/Contract Law						X
Administer Criminal Law						X
Conduct Claims						X
Provide Legal Assistance						X
Interpret International/Operational Law						X

P=Point to Point Intervisibility

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Provide Health Services	P	T	B	S	M	NA
Provide Medical Treatment						
Administer First Aid						X
Provide Advanced Trauma Life Support						X
Provide Initial Surgical Care/Medical Treatment						X
Manage/Treat Battle Fatigue						X
Provide Dental Services						X
Evacuate Casualties						
Remove Sick/Wounded/Injured Soldiers from the Immediate Battle Area	X	X				
Determine Destination for Evacuation	X	X			X	
Remove Sick/Wounded/Injured to Appropriate Treatment Facility	X	X				
Provide Preventive Medicine						
Apply Field Sanitation Methods						X
Provide Preventive Medicine Services						X
Provide Stress Control Consultation						X
Perform Personal Hygiene						X
Maintain Physical Fitness						X
Provide Veterinary Services						
Provide Sanitary Inspections						X
Inspect Food Supplies						X
Provide Veterinary Care to Animals						X
Provide Zoonotic Disease Control						X
Distribute						
Provide Transport Services						
Conduct Terminal Operations						
Receive Requirements						
Determine Type and Quantity of Cargo to be Moved						X
Determine Methods of Transport						X
Unload						
Prepare System to Receive Load						X
Conduct Cargo Transfer at Destination						X
Load						
Perform Load Calculations						X
Configure System to Receive Load						X
Prepare Load						X
Conduct Cargo Transfer						X
Provide Terminal Services						
Move/Evacuate Cargo, Equipment, and Personnel						
Move by Surface						
Conduct Motor March	X	X				
Conduct Railway Transport	X	X				
Conduct Waterways Transport	X	X				
Operate Pipelines						X

P=Point to Point Intervisibility
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 NA=Not Applicable

Move by Air	P	T	B	S	M	NA
Request Airlift/Airdrop				X	X	
Conduct Aerial Transport	X	X			X	
Supply the Force						
Request Supplies						
Determine Requirements						X
Determine On-hand/Due-in Stocks						X
Prepare Requisitions						X
Determine Source/Location of Supply Items						X
Receive Supplies						
Determine Type and Quantity of Shipment						X
Perform Quality Assurance Inspections of Supplies						X
Produce Supplies						
Establish Production Facilities						X
Obtain Materials and Components						X
Modify/Adapt Commodity for Military Use						X
Manufacture Commodity						X
Package Commodity						X
Procure Supplies						
Determine Requirement for Commercial Sources						X
Process Captured Supplies						X
Store Supplies						
Employ Storage Methods						X
Perform Storage Facilities Inspections						X
Inspect/Test Supplies for Serviceability						X
Conduct Inventories						X
Protect Supplies						
Provide Protective Containers/Packaging						X
Protect Supplies Against Natural Elements					X	
Protect Supplies Against NBC Agents						X
Protect Supplies Against Ballistic Effects			X		X	
Relocate Supplies						
Issue Supplies						
Determine Method of Issue						X
Establish and Operate a Transfer/Distribution Point	X				X	
Provide Sustainment Engineering						
Perform Rear Area Restoration						
Control Flooding	X				X	
Fight Fires	X				X	
Restore Basic Utilities						X
Clear Rubble						X
Perform LOC Sustainment						
Construct/Maintain Roads and Highways					X	
Construct/Maintain Over-the Shore Facilities					X	
Construct/Maintain Ports					X	

P=Point to Point Intervisibility

T=Target/Background Contrast

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NA=Not Applicable

	P	T	B	S	M	NA
Construct/Maintain Railroad Facilities					X	
Repair/Expand Existing Airfield Facilities					X	
Provide Engineer Construction Support						
Construct Marshalling, Distribution, and Storage Facilities						X
Construct Pipelines						X
Construct/Renovate Fixed Facilities						X
Drill Wells for Water						X
Dismantle Fortifications						X
Provide Engineer Construction Material						
Produce Basic Construction Material						X
Manufacture Construction Products						X
Provide Military Police Support						
Perform EPW Operations						
Collect and Evacuate Prisoners of War						X
Provide Prisoner of War Internment						X
Conduct Law and Order Operations						
Perform Law Enforcement						X
Conduct Criminal Investigations						X
Provide Military Prisoner Confinement						X

P=Point to Point Intervisibility

T=Target/Background Contrast

B=Ballistic Trajectory/Terrain Height

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NA=Not Applicable

5.0 RESULTS

Figure 9 below presents the percentage of tasks, listed by BOS, that are judged to be affected by each terrain feature. The last column of Figure 9 shows the percentage of all tasks affected by a given terrain/feature. Based upon this analysis, 50% of all the warfighting tasks will not be affected by the terrain/features that were evaluated. Of those tasks affected, however, map/terrain image correlation will be the most critical followed by point-to-point intervisibility, target/background contrast ratio, signal attenuation, and finally ballistic/trajectory terrain height. Moreover, the ballistic/trajectory height feature is not very critical since it affects, on the average, only about one percent of the tasks. Figure 10 presents the most critical terrain/feature presented by BOS. A "critical" terrain/feature is defined as that terrain/feature which impacts the performance of the most tasks within a given BOS.

	Maneuver BOS	Fire Support BOS	Air Defense BOS	C2 BOS	Intelligence BOS	Mobility & Survivability BOS	Combat Service Support BOS	All Tasks/BOS
Point-to-Point Intervisibility	38	12	19	1	20	19	7	16
Target/Background Contrast Ratio	32	6	19	1	15	2	6	10
Ballistic/Trajectory Terrain Height	0	3	6	0	0	0	1	1
Signal Attenuation	0	9	6	21	3	9	2	6
Map/Terrain Image Correlation	16	15	14	34	19	23	9	17
N/A	14	55	36	43	43	46	75	50

Figure 9. Percentage of tasks, by BOS, affected by each terrain feature.

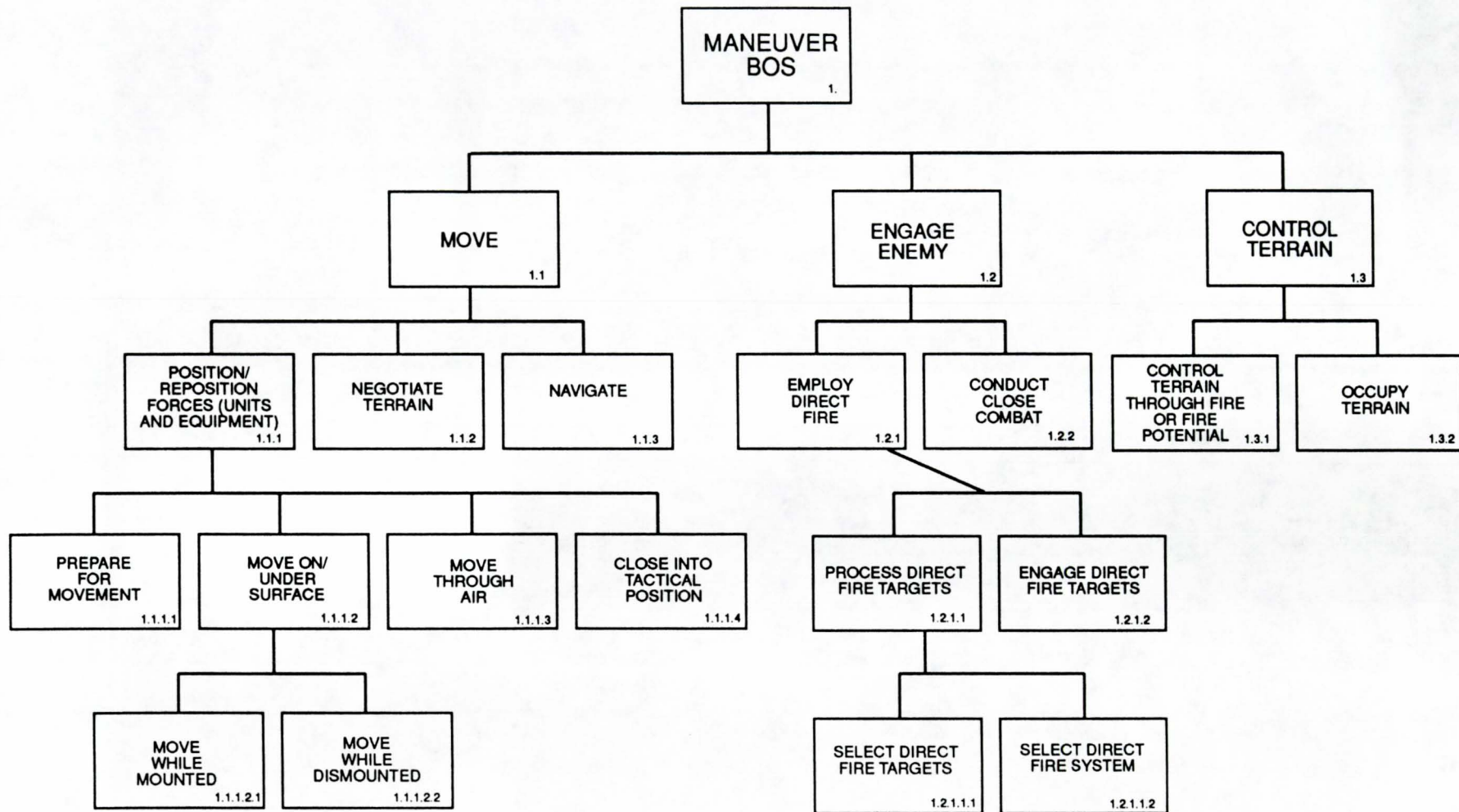
	Maneuver BOS	Fire Support BOS	Air Defense BOS	C2 BOS	Intelligence BOS	Mobility & Survivability BOS	Combat Service Support BOS
Point-to-Point Invisibility	X	X	X		X		
Target/Background Contrast Ratio			X				
Ballistic/Trajectory Terrain Height							
Signal Attenuation							
Map/Terrain Image Correlation			X	X		X	X

Figure 10. Most Critical Terrain/Feature By BOS

6.0 REFERENCES

Department of the Army (1989). Blueprint of the Battlefield (TRADOC Pamphlet No. 11-9). Fort Monroe, VA: Headquarters, United States Army Training and Doctrine Command.

APPENDIX A
BOS TASK HIERARCHIES



A-2

0225-1910

FIGURE 2. MANEUVER BOS TASK HIERARCHY

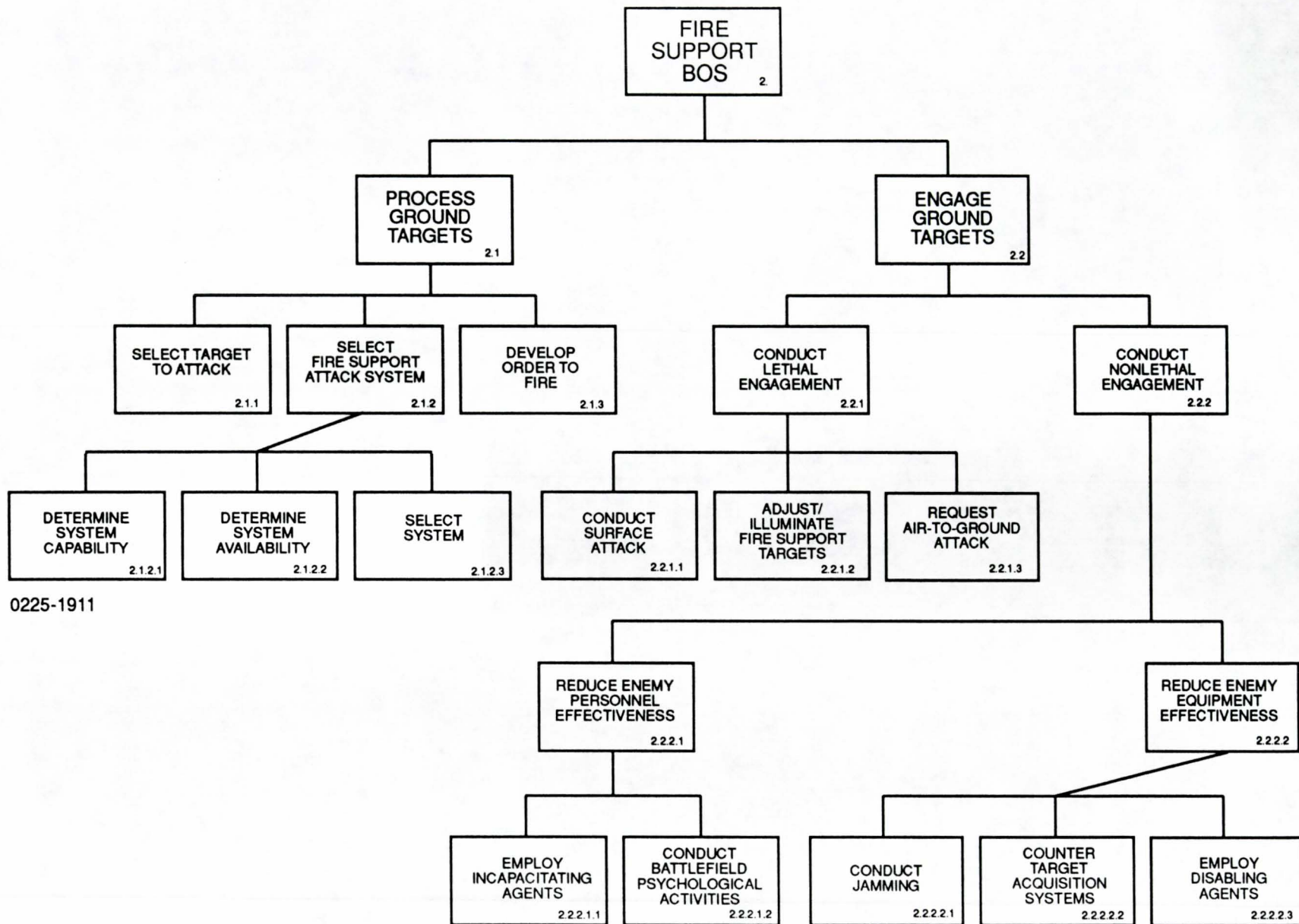
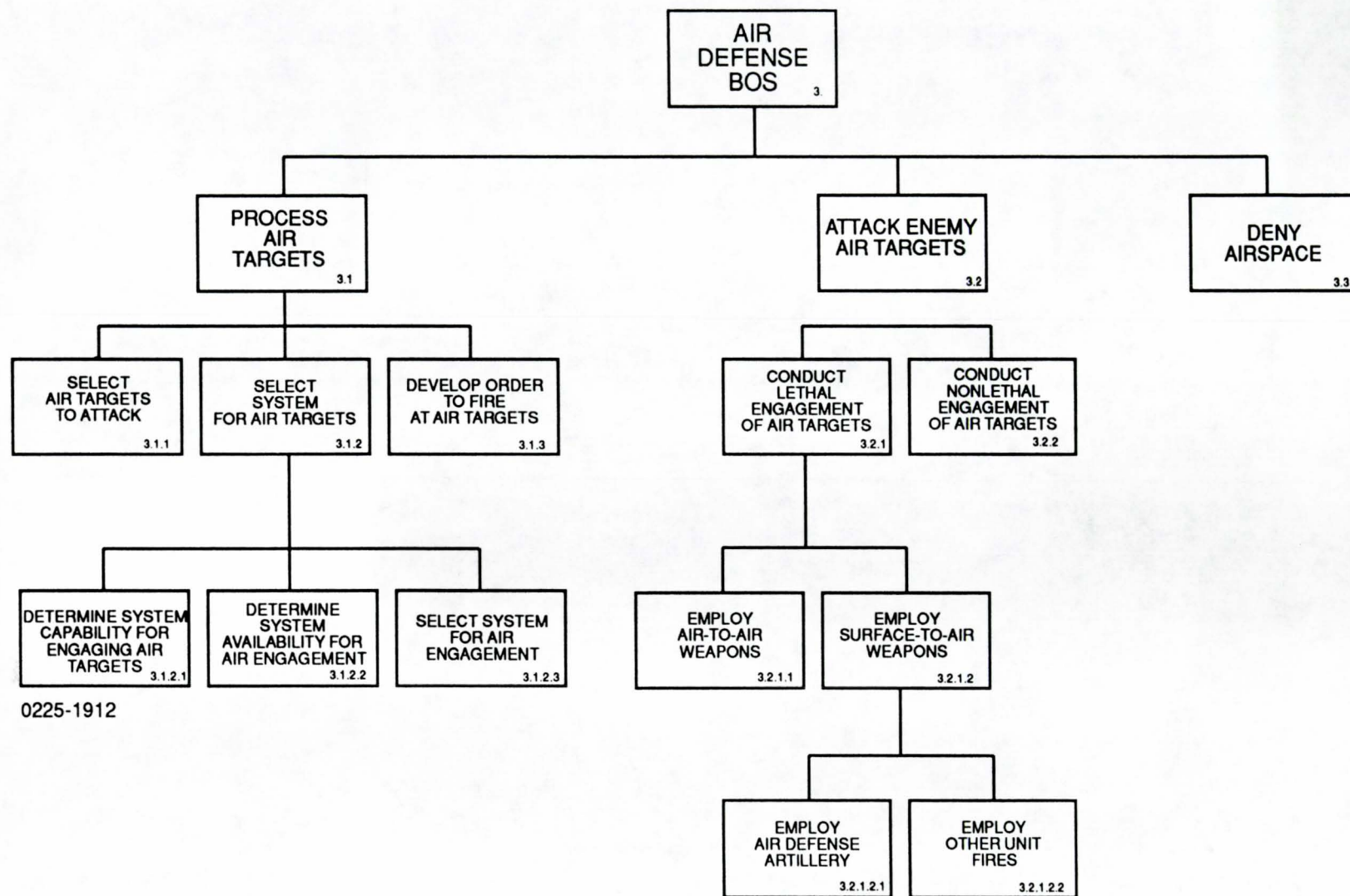


FIGURE 3. FIRE SUPPORT BOS TASK HIERARCHY



A-4

FIGURE 4. AIR DEFENSE BOS TASK HIERARCHY

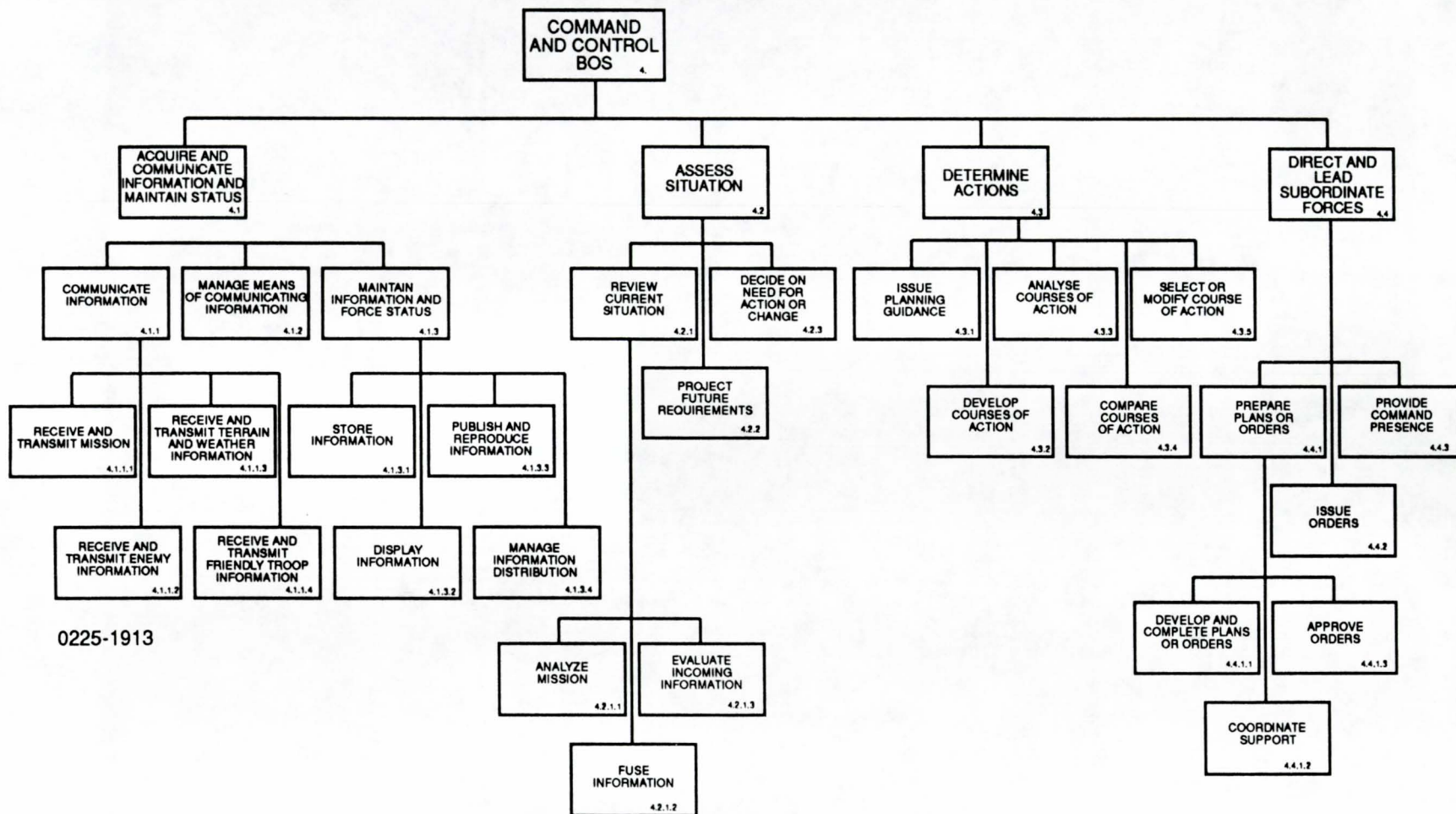
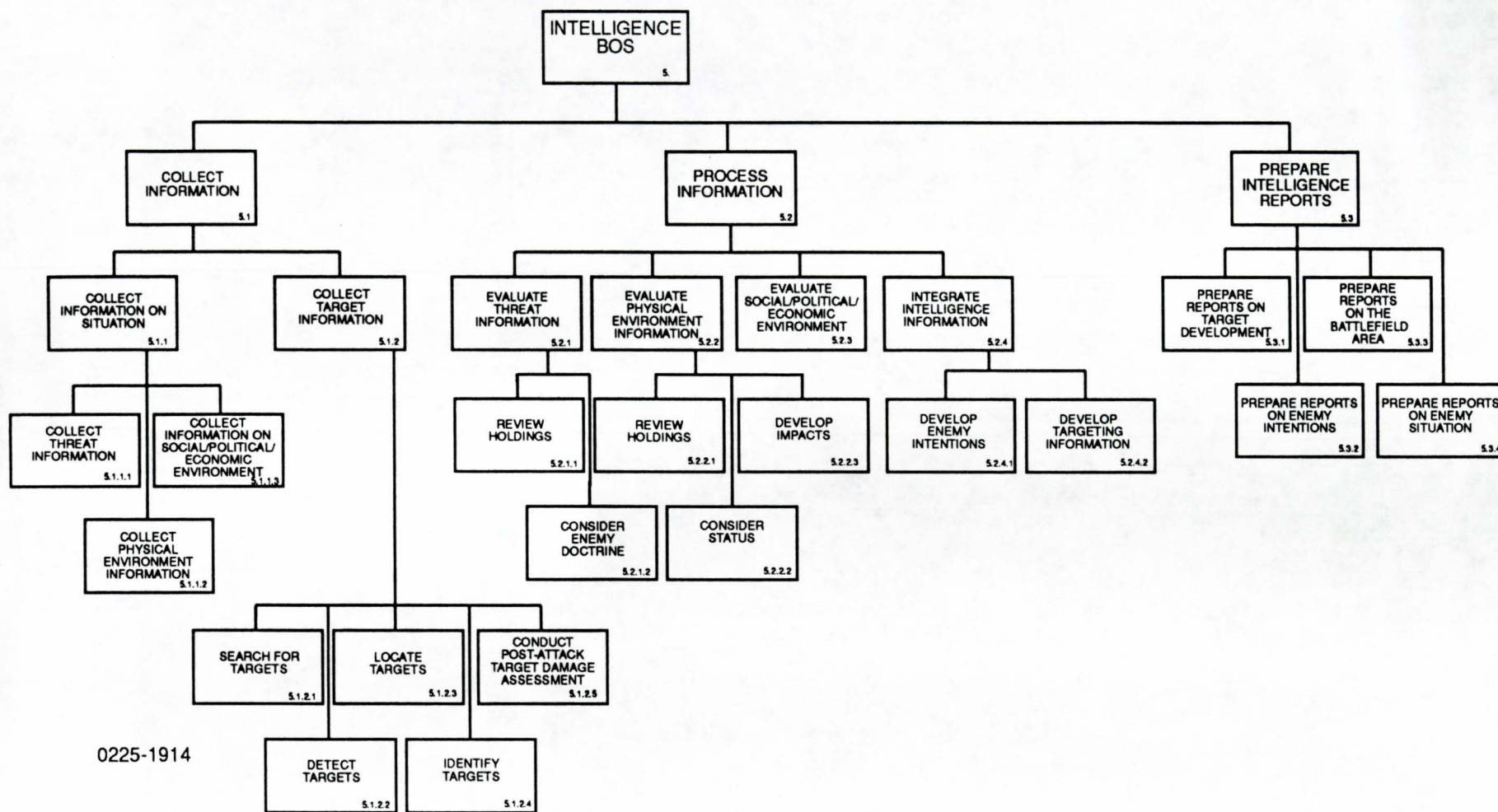
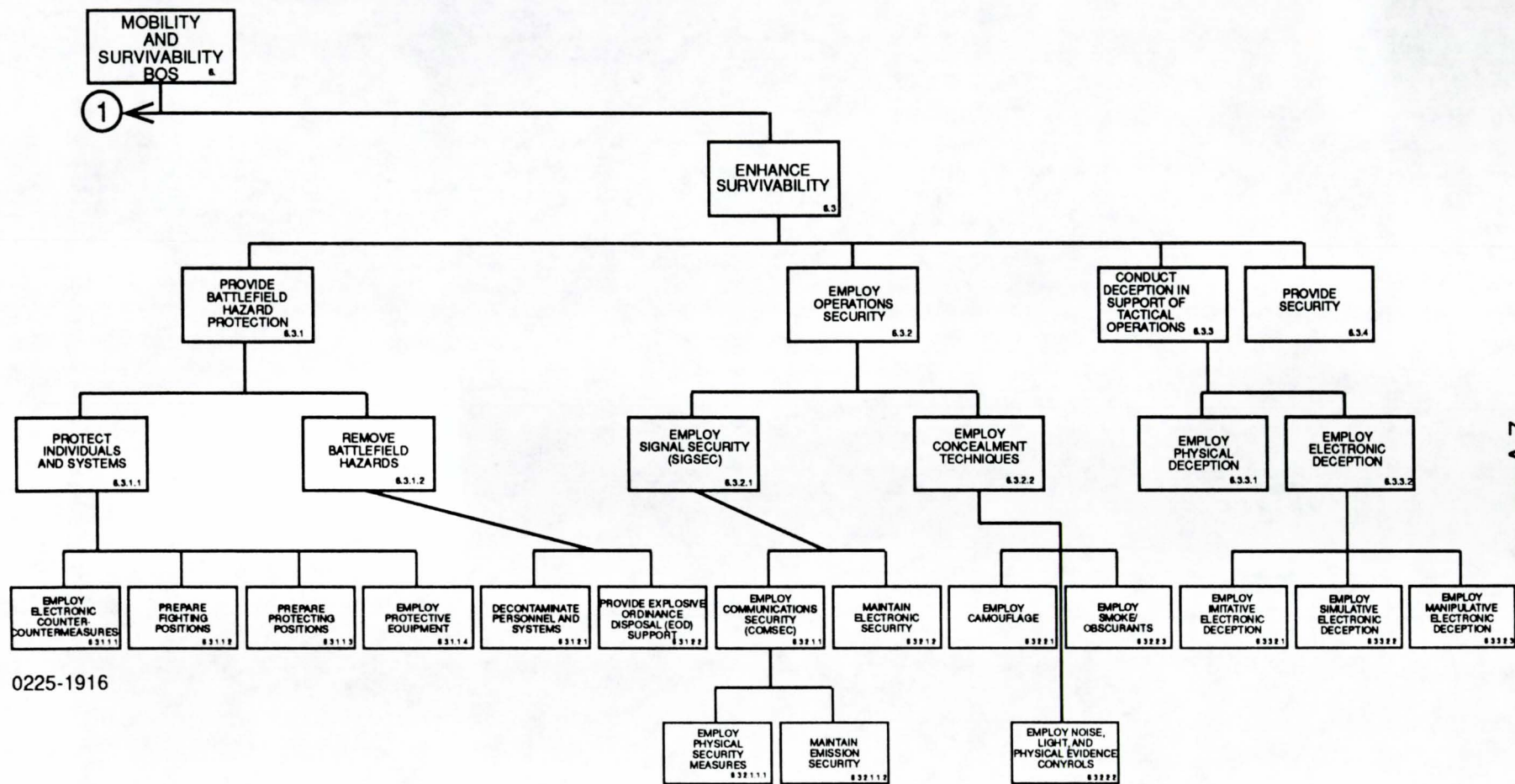


FIGURE 5. COMMAND AND CONTROL BOS TASK HIERARCHY



0225-1914

FIGURE 6. INTELLIGENCE BOS TASK HIERARCHY



0225-1916

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FIGURE 7b. MOBILITY AND SURVIVABILITY BOS TASK HIERARCHY (CONT'D)

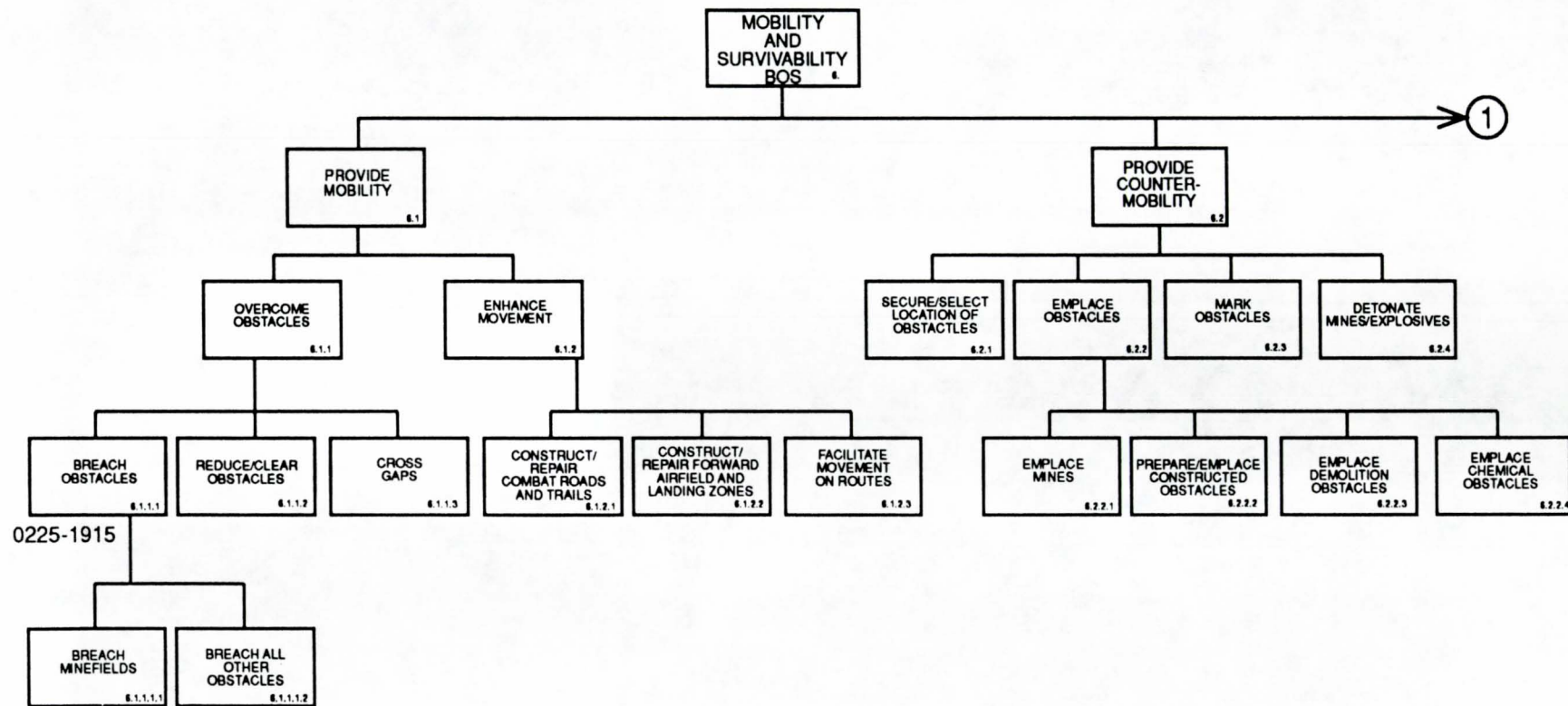
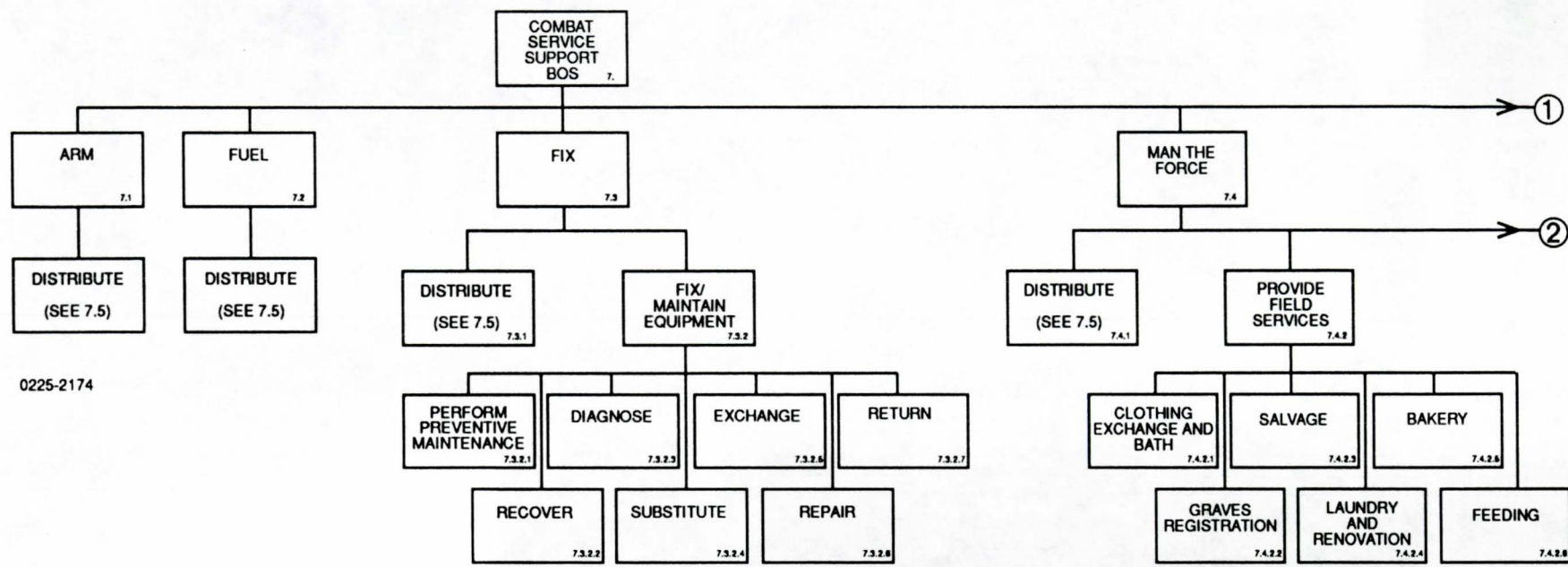


FIGURE 7a. MOBILITY AND SERVIVABILITY BOS TASK HIERARCHY



(NOTE: THESE SYSTEM TYPES CAN APPLY TO EACH OF THE SEVEN SUBFUNCTIONS 7.3.2.1 TO 7.3.2.7)

- 7.3.2.X.1 TROOP SUPPORT MATERIAL
- 7.3.2.X.2 COMMUNICATIONS AND ELECTRONICS
- 7.3.2.X.3 VESSELS & WHEELED/TRACKED VEHICLES
- 7.3.2.X.4 AIRCRAFT
- 7.3.2.X.5 WEAPONS AND GUIDANCE SYSTEMS
- 7.3.2.X.6 MISSILE SUPPORT SYSTEMS
- 7.3.2.X.7 MEDICAL EQUIPMENT

Figure 8a. Combat Services Support BOS Task Hierarchy

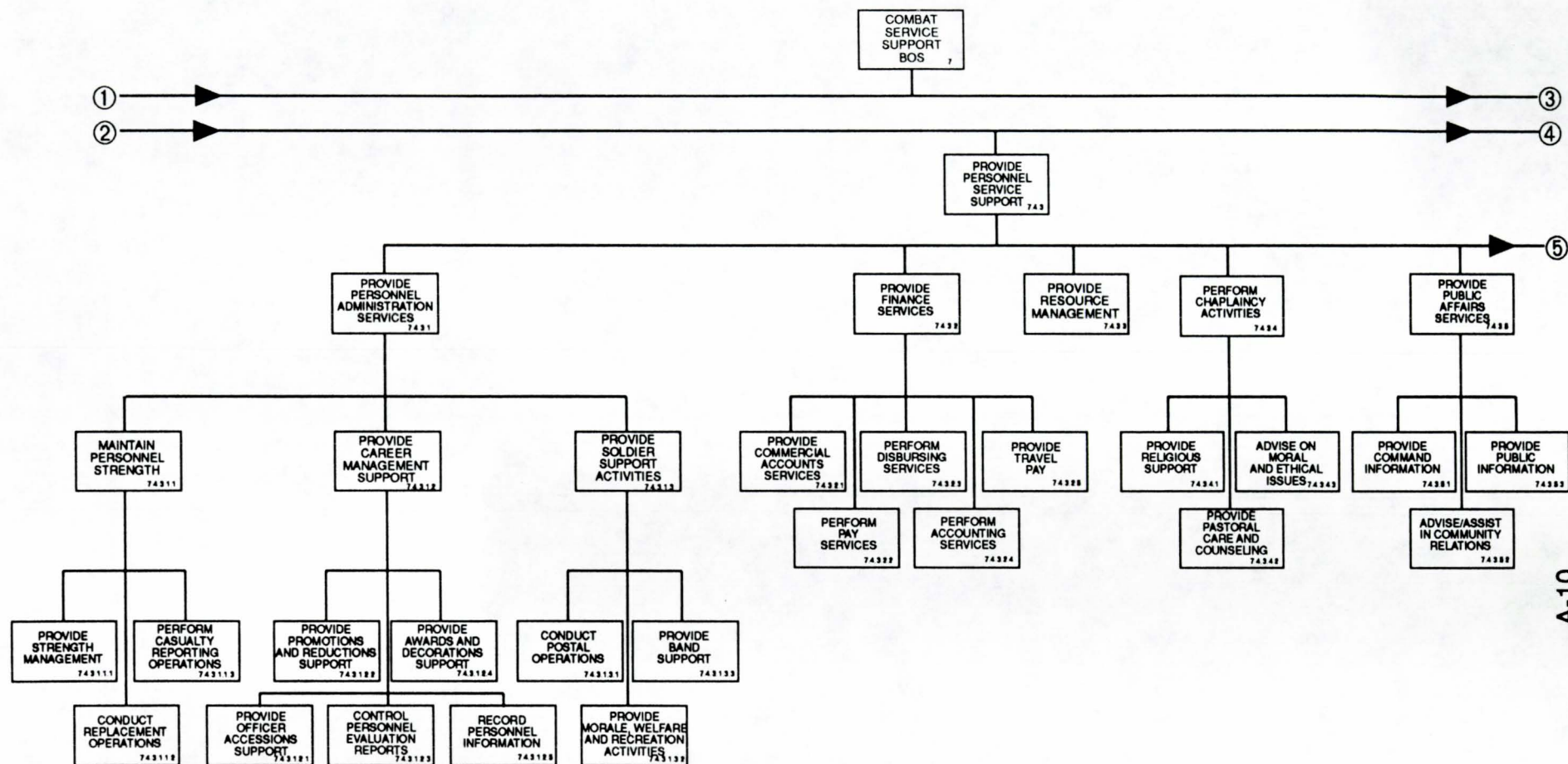
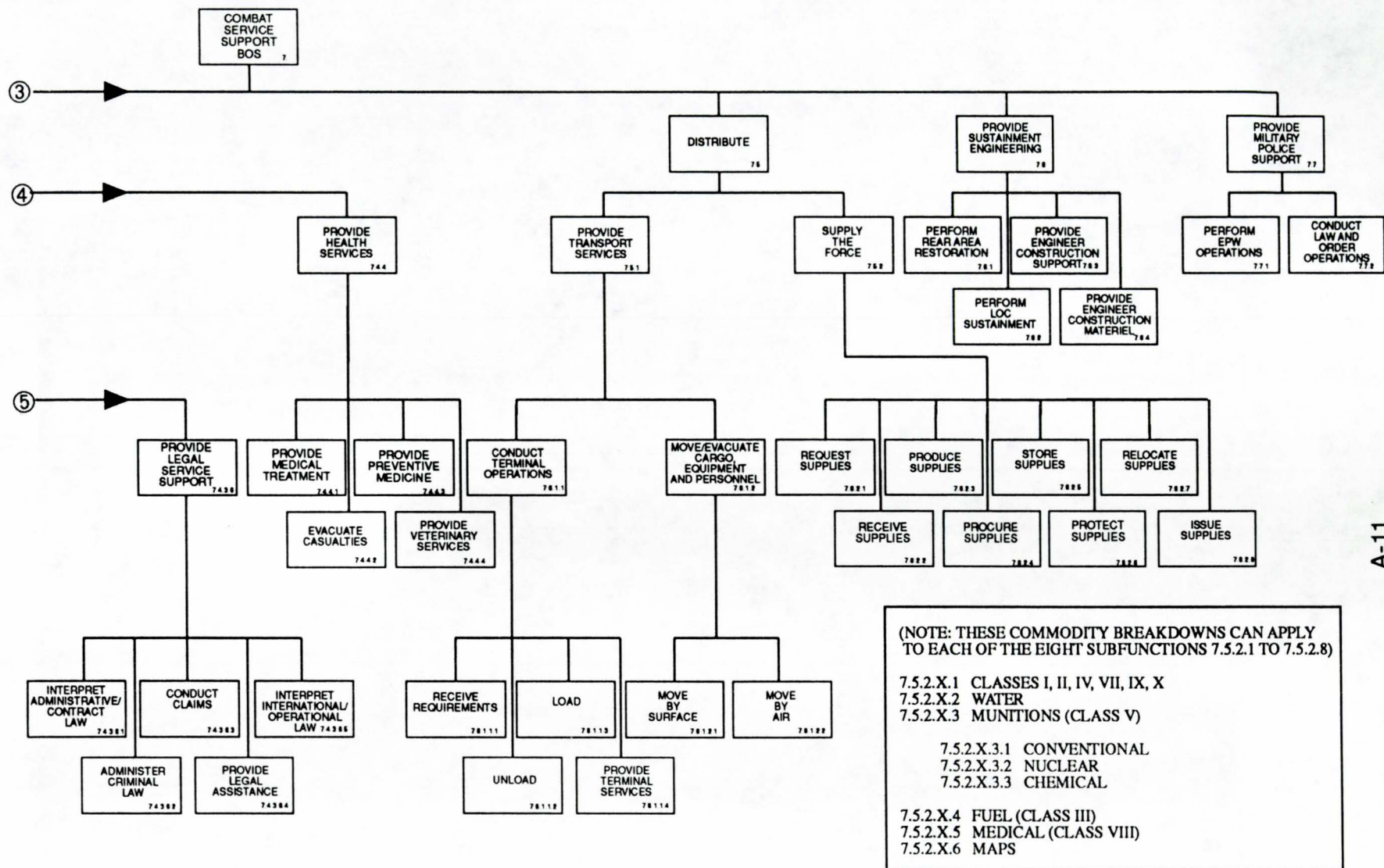


Figure 8b. Combat Services Support BOS Task Hierarchy (Cont'd)



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Figure 8c. Combat Services Support BOS Task Hierarchy (Cont'd)

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